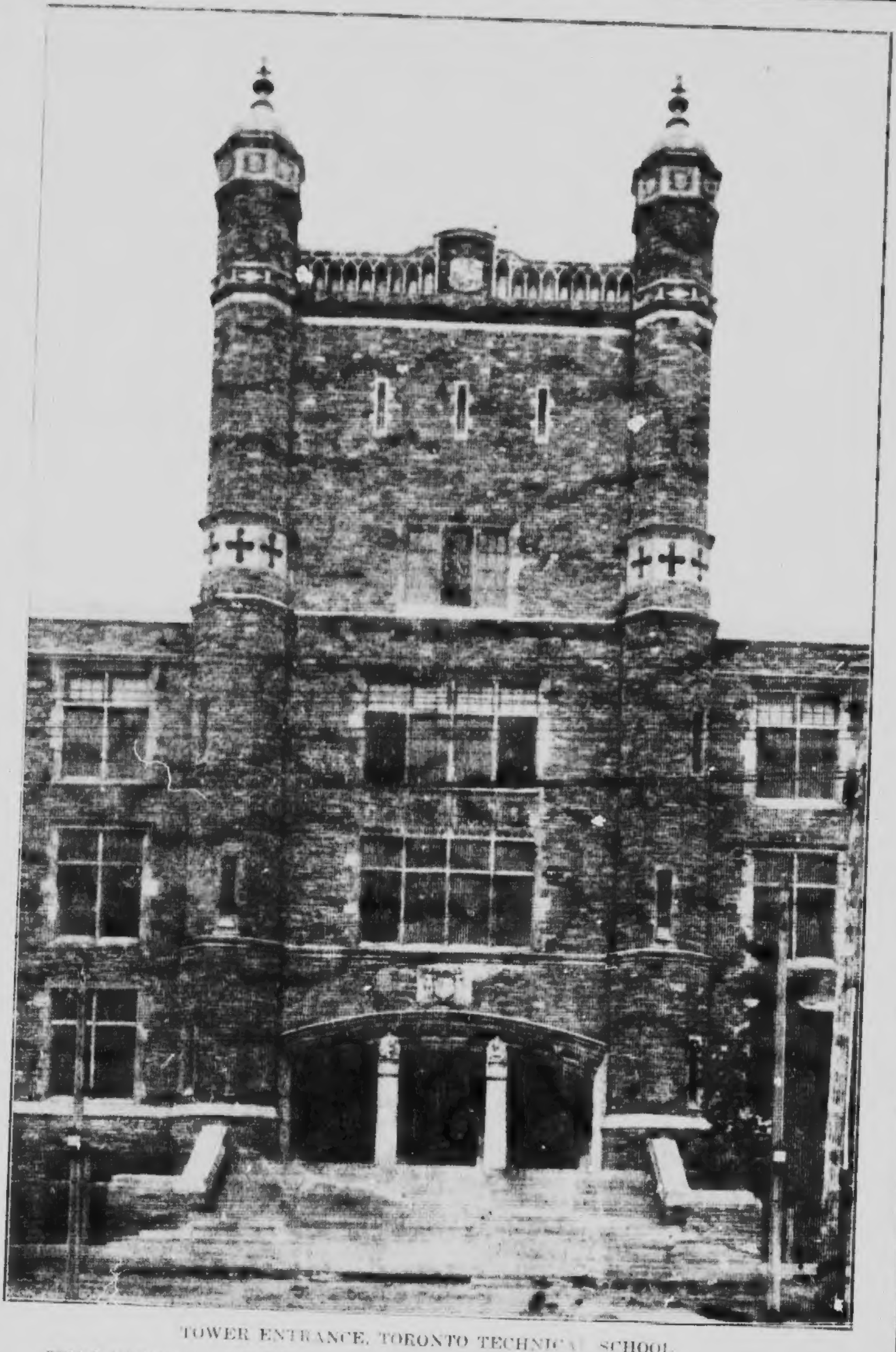
7

OFFICIAL
CONVENTION
PROGRAM OF THE
ONTARIO ASSOCIATION
and DOMINION CONFERENCE
OF THE ASSOCIATIONS FOR THE PROMOTION OF
TECHNICAL EDUCATION

AND

HISTORICAL
SOUVENIR OF THE
TECHNICAL SCHOOL
TORONTO

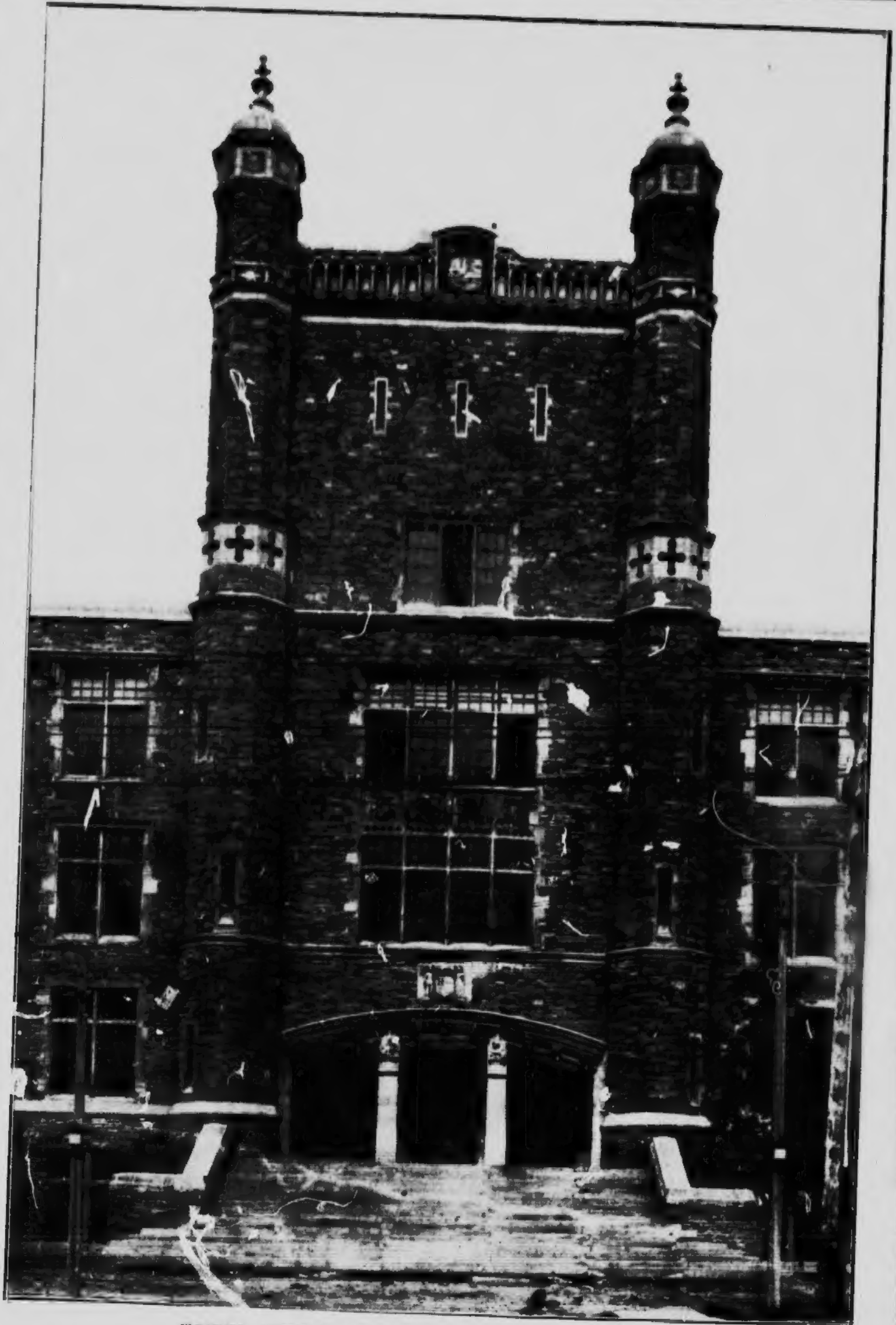


TOWER ENTRANCE, TORONTO TECHNICAL SCHOOL

ROSS & MACDONALD, ARCHITECTS.

CREDIT VALLEY STONEWORK—REES & HAW[illegible]

[illegible] BROS. CO., CONTRACTORS



TOWER ENTRANCE, TORONTO TECHNICAL SCHOOL.

ROSS & MACDONALD, ARCHITECTS.
NORCROSS BROS. CO., CONTRACTORS.
CREDIT VALLEY STONEWORK—REES & HAWKINS.

AGRICULTURE

Educational work in Agriculture is carried on by the Department of Agriculture in many ways.

Ontario Agricultural College

Gives two and four year Courses for boys, as well as Short Courses in all branches of Agriculture.

The Macdonald Institute gives three months, twelve months and two year courses for girls in Domestic Science.

Write to the President for further information.

Special Summer Courses for school teachers and Inspectors.

District Representatives

Located in almost every County carry on Six Weeks' Courses and School Fairs, as well as various other lines of educational work.

The importance of the work entitles it to the co-operation of all interested in education, especially technical education.

JAMES S. DUFF,
Ontario Minister of Agriculture.

Board of Education, Toronto

W. W. Hodgson, ***Chairman.***

Members**—W. J. Boland, Caroline Brown M.D., C. A. B. Brown, W. Dineen, Jas. A. Ellis, R. D. Fairbairn, R. R. Hopkins, M.D., W. Houston, M.A., J. Hunter, M.D., W. O. McTaggart, B.A., J. Noble, M.D., Geo. Oakley, Jr., W. H. Shaw, G. J. Steele, D.D.S., Miles Vokes.**

The Advisory Industrial Committee

Rhys D. Fairbairn, ***Chairman.***

Members**—F. Bancroft, Geo. Brigden, W. Dineen, Jas. A. Ellis, Wm. Houston, M.A., Henry Mason, W. O. McTaggart, B.A., John Noble, M.D., J. Richards, R. J. Stevenson.**

Staff of the Technical School

A. C. McKay, B.A., LL.D., ***Principal.***

W. S. Kirkland, M.A., Assistant Principal Evening Schools.
J. M. Warren, B.A., Assistant Principal Day Schools.

Directors**—W. C. Blackwood, B.A., Sc., Physics; Margaret Davidson, Domestic Science; Helen E. Downey, B.A., Modern Languages; A. Howell, A.R.C.A., Art and Design; W. S. Kirkland, M.A., Architecture, Machine Drawing and Design; A. E. MacLean, B.A., English and History; J. W. McBean, B.A., Shop Work; Ruth P. Sill, Domestic Art; J.M. Warren, B.A., Mathematics; W. J.Wilson, B.A., Chemistry and Geology; M.S. Smith, B.A., Sc., Engineering.**

Origin of the Technical Schools

The City of Toronto in 1891 organized evening classes in the old Wycliffe Hall, on the north side of College Street, opposite McCaul Street, under the name of the Toronto Technical School. The growing demand for technical education and the necessity for securing another building induced the City Council in 1900 to purchase the building at 149 College Street, opposite University Crescent. In 1901 day classes were added to the evening classes. In 1904 the Technical School Board, the High School Board, and the Public School Board were replaced by the present Board of Education; and under this Board the School was organized as a Technical High School.

In 1911 the schools were placed under the management of an Advisory Industrial Committee, appointed by the Board of Education. This Committee consists of twelve persons, six of whom are selected from the Board of Education, and six from the manufacturing or other industries, three of the latter being employers of labor or directors of companies employing labor, and three being employees.

In November, 1911, the Advisory Industrial Committee, acting under the recent Industrial Education Act, adopted a scheme of reorganization, presented in the following statements:

1. That the work of Technical and Industrial education should be developed in a Central Technical School, and in Branch Technical Schools.

2. That in each of these schools courses should be arranged for both Day and Evening Classes.

3. That in the Central School there should be organized the following courses:

FOR DAY PUPILS.

(a) Industrial courses (General and Special), extending over four years for boys, and over three years for girls; one-half of the time in the last two years in each course to be devoted to actual shop-practice.
Pupils to be admitted to these courses are required to present a certificate of having obtained at least Fourth Form Standing in a Public or Separate School.

(b) Matriculation courses, extending over four years, admitting to University Departments of Applied Science and Household Science.
Pupils to be admitted to these courses are required to be duly qualified to enter a High School.

(c) Special short courses of theoretical and practical technology, including courses for part-time students, pupils to be admitted at the discretion of the Principal.

(d) Courses in Fine and Applied Arts, with special adaptation to the industries, pupils to be admitted at the discretion of the Principal.

FOR EVENING PUPILS.

(a) Industrial courses, with practical demonstrations under the direction of skilled workmen, open only to those actually engaged in the trade or occupation.

(b) Technical courses, including theoretical and applied mathematics.

(c) Art courses, with special adaptation to industries.

(d) Domestic Science courses.

4. That each branch school should be organized to provide for Day Pupils:—

(a) For Boys, the work of the first and second years of the Technical and Industrial courses for boys of the Central School, and such practical art and trade work of the third year as may be conveniently provided.

(b) For girls, the work of the first year of the Technical and Industrial courses for Girls of the Central School, and such practical art and trade work of the second year as may be conveniently provided.

5. That each Branch School should be organized to provide for Evening pupils. The first year courses in Mathematics, Physics, Industrial Art, Chemistry and Domestic Science, which are offered in the Central School to Evening Classes.

6. That the work of the branch schools should be under the direction and supervision of the Principal and Directors of the Central School.

The Norcross Bros. Co.

BUILDERS

General Contractors for the Toronto Central Technical School

Specialists in School Construction and Banks

OFFICE	MILLS
Toronto, 98 Bay Street	Marble and Freestone, Toronto, Ont.
Montreal, New Birks Building	Granite, Iberville, Que.

Some of the Buildings Built in Canada by us

Bank of Toronto, Toronto
Central Technical School
Royal Trust, Montreal
Exterior Sun Life Bldg., Montreal
Drumond Bldg., Montreal
Bank of Montreal, Winnipeg
Bank of British N.A., Montreal
Interior Bank of Montreal, Montreal
Exterior Art Museum, Montreal
National Trust Bank, Montreal
Bank of Commerce, Windsor, Ont.

Canadian General Fire Extinguish Co.

LIMITED

Toronto **Montreal** **Winnipeg** **Vancouver**

Engineers and Contractors

Steam and Hot Water Heating

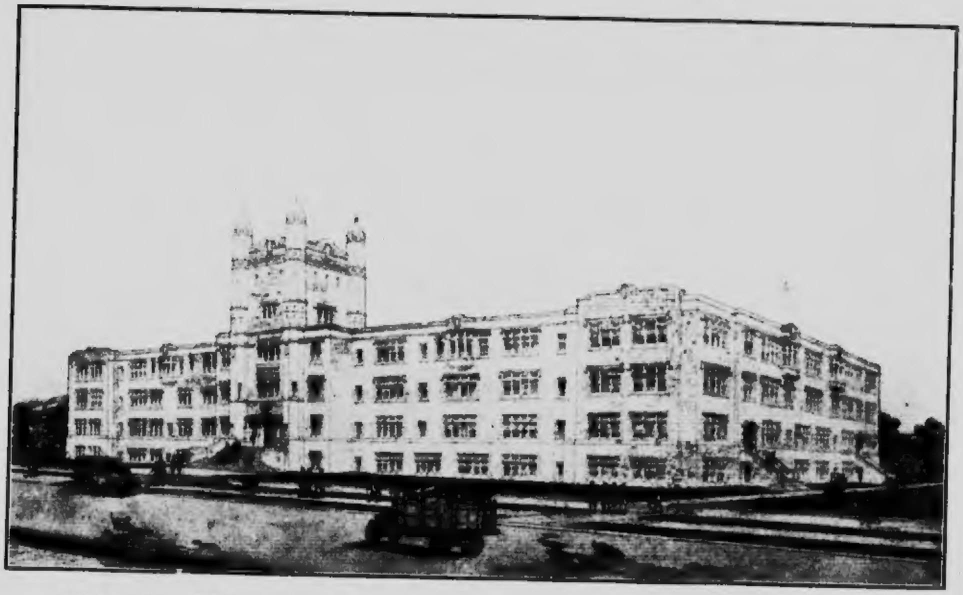
Power Piping

Grinnell Automatic Sprinklers

Full Stock

Steamfitters' Supplies

The Central Technical School Building



CENTRAL TECHNICAL SCHOOL, LIPPINCOTT AND HARBORD STREETS.

ROSS & MACDONALD, ARCHITECTS. NORCROSS BROS. CO., CONTRACTORS.

The site of the new Technical School is bounded by Borden, Harbord, Lippincott and Lennox Streets, and is about six acres in extent and covers the site of four blocks.

In connection with the completion and opening of this great building, a brief review of the circumstances leading up to this consummation may be of general interest. For several years the Board of Education had given its best thought to to the study of the important subject of Technical Education, and realized the supreme necessity of the most up-to-date equipment, housed in a building which in itself would combine the essentials of Convenient Location, Adequate Space, Modern Construction and Architectural Merit. After the location was determined and the site secured, an invitation was issued on March 30th, 1912, to the Architects of Canada to submit competitive drawings, based upon conditions which outlined the requirements as to space and accommodation for the several departments of Industrial training and research.

The conditions required that the plans should include an Assembly Hall, a Lecture Theatre, three Lecture Rooms, thirty Class Rooms, Workshops for instruction in twenty different trades, Chemical Laboratories for instruction in twelve subjects, Draughting Rooms for instruction in ten different subjects, a Laboratory for Mathematics, a whole floor for Household Science, a Gymnasium, Plunge and Shower Baths, Assembling and Supply Rooms, Exhibition Room, Reading Room, the necessary Administration Offices, Staff Rooms, Power Plant, and these stated requirements called for an area of 184,750 sq. ft.

The building was to be fireproof in construction—it was to be designed so that the elevations of the four streets enclosing the site would be of equal value and importance, so planned that it could be used for a Night School and a Day School for both sexes. The question of

PROVINCE OF ONTARIO

DEPARTMENT OF LANDS FORESTS & MINES

BUREAU OF MINES

ONTARIO'S MINERAL INDUSTRY

The Province of Ontario has an estimated area of 407, 262 square miles, 70 per cent. of which is occupied by pre-Cambrian formations which are pre-eminently the metal-bearing rocks of America. In these rocks occur the phenomenally rich silver mines of Cobalt, the far-famed nickel-copper deposits of Sudbury, the iron ore of Helen, Magpie and Moose Mountain mines, and the gold of Porcupine and Kirkland lake.

Ontario's mineral resources cover practically the entire list of metallics and non-metallics with the exception of coal. The rapid growth of the mineral industry during the last two decades is shown by the following figures:—

Year	1893	Value	$ 6,120,753
"	1903	"	12,870,593
"	1913	"	53,232,311

The mining laws of Ontario are liberal. A Miner's License costs $5 per annum and entitles the holder to stake out three claims a year in each or any mining division. For list of publications, maps, reports and mining laws, apply to

HON. G. H. FERGUSON, Minister of Lands, Forests and Mines, Toronto, Ont.

The Boiler Inspection and Insurance Co., of Canada

1875 CONSULTING STEAM ENGINEERS EFFICIENCY EXPERTS 1915

THE ONLY COMPANY IN CANADA making a SPECIALTY of the Inspection of Steam Power and Steam Heating Plants

The Government Insurance Reports for the year ending 31st December, 1914, show that

OVER FIFTY SEVEN PER CENT

of all persons, firms and corporations carrying boiler insurance in Canada have their boilers under the inspection of

The Boiler Inspection and Insurance Company

Service Protection Supplemented by Insurance Protection

Rates for Inspection and Insurance furnished on application to

EASTERN BRANCH
Board of Trade Building
MONTREAL
OLAF E. GRANBERG
Manager

HEAD OFFICE
Continental Life Building
TORONTO
H. N. ROBERTS
General Manager

WESTERN BRANCH
904 Electric Railway Chambers
WINNIPEG
A. L. G. TAYLOR
Resident Inspector

disposition and area of windows and roof lights was to be considered, the maximum of light and air being obtained, and the building was not to exceed five stories in height.

The Architects of Canada made a ready response to the invitation, as the requirements of the competition were well studied and set forth, and the problem was so attractive. Seventeen sets of drawings were submitted on June 15th, 1912; within one week the award was made, and the successful Architects were instructed to prepare the working drawings, etc., and receive tenders for the work.

Estimates were received in January, 1913, and after modifications in materials proposed, final tenders were received in March, 1913. The Advisory Industrial Committee instructed the Architects, Messrs. Ross & Macdonald, to accept the tender of Messrs. Norcross Bros., and have the work started and completed with all possible speed.

It should be mentioned that the successful designs embodied in every particular the requirements of the conditions, and the Building in plan has been finished in strict conformity with the original competitive designs.

The style of Architecture is Gothic, of a type admirably suited for an Educational Institution, which requires maximum areas of window space to give adequate lighting to class rooms, yet preserving sufficient wall spaces for Architectural effect in the use of material and sculptured ornament. In this building the style of architecture selected is entirely satisfactory in the mass, whether viewed from the front with its massive well proportioned Tower, with the flanking wings, or on the rear where the treatment of the centre spaces and the structures on each side successfully combine the necessities of the Power Plant

There are many details of interest to the student in the design and construction of the building, which will no doubt be availed by the Teaching Staff of the School.

A solution of the problem as regards internal arrangement and equipment only was a great undertaking, which has had a most satisfactory result, and, none the less, the solution of the problem as regards the Architectural expression has, in the evolution of the plan and the style employed, resulted in a building equal to any of its kind, not only in Canada, but throughout the United States as well, in fact the whole scheme is unique, and there are no comparisons available.

The desire of the Advisory Industrial Committee with respect to the use of Canadian and local materials and labor has been fully respected, and the decision to use the Credit Valley Stone for the exterior, instead of brick, and particularly the admixture of color and method of construction decided upon, has resulted in one of the most interesting and attractive pieces of masonry work in Canada. All materials used in construction have been selected with a view to economy in first cost, then in maintenance. Consistency for its purpose has also been a factor, giving evidence of constructional value and architectural merit, an inspiration and ample illustration in the structure itself for the students trained within its walls.

The safety, comfort, health of the students, have been subjects of serious thought and determination, as seen in the arrangement of corridors, exits and stairways, the fireproof materials used in construction, the quality, quantity and distribution of plumbing facilities, and the heating and ventilating equipment provided throughout. Particular mention is made of the lighting of the ground floor rooms, and the workshops, which latter have such splendid lighting, although inside rooms, depending almost entirely for roof light by day.

The following are costs in connection with the execution and completion of this important undertaking:

Site	$ 228,419.57
Building	1,411,217.74
Equipment and furnishings	284,395.00

The building was formally handed over by the Architects to the Board of Education on May 27th, 1915, almost two years after the work was commenced on the site; this is a real achievement for the several contractors of the City of Toronto, who by their combined and earnest effort have assembled in progressive order the materials required, and guided the activities of hundreds of men employed almost continuously on this great undertaking.

It has been the pleasure and enthusiastic effort of the Architects, under the instruction of the Advisory Industrial Committee, and with the able and most painstaking assistance of the Principal, Dr. McKay, to hand over to the Citizens of Toronto a Building that will for many years to come meet the Industrial need of the Community in the preparation and thorough training of the students who seek such tuition and equipment for their life work.

The building, which faces west on Lippincott street, is 430 feet long and 227 feet deep, and five storeys in height. The main entrance is opposite Herrick Street. The floors are designated A, B, C, D; A being the basement or shop floor, B the main entrance floor. Floor C, with the exception of the boys' lunch room, is wholly devoted to women's work in Domestic Science and Domestic Art. The halls in the building on the different floors are designated East, West, North, South and Middle. The rooms are numbered thus, for example, B N 5. The first letter B indicates the floor; the second letter N, the hall; the number 5, the room on the hall.

The building contains 6,000,000 bricks. The corridors equal nearly ½ mile in length and average eleven feet in width. There are 600 plumbing fixtures in the school. The tower is 125 feet high.

ENGINEERING SURVEY.

The Advisory Board, in concert with the principal and his advisors, acted well when they decided to include in the terms for competition by the Architects, a clause that Engineers should have independent control of all work in connection with mechanical trades throughout the building.

Here in the biggest Technical School in the world was to be as near a model plant as could be got, and certainly the power, lighting and ventilating plants are as efficient and compact as any to be seen.

The engineers received instructions to co-operate with the Architects, and the result has been satisfactory to all concerned. Much credit is due, for the energetic control exercised, to the Engineers, the Canadian Domestic Engineering Co., Ltd., of Toronto and Montreal, who were selected for the work from a large number of applicants, on account of their extensive experience, especially in connection with school work in Canada. There has been a saving to the city of many thousands of dollars. To quote one instance:—2 additional wiring ducts were recommended and by this $10,000 was actually saved in material.

Undoubtedly it was no small responsibility to make adequate provision for all calls for light and power in a building of this magnitude, and yet not to have too big a surplus—as so often does happen, in fact, to put it briefly, there has been no waste, and no other building contains better value for the money. Public spiritedness on the part of many contractors has induced them to put in work and material at an actual loss to themselves. A comparison of the plant supplied with specifications confirms this statement, but then some have told the writer "well—it was for a good purpose—to help on Technical Education."

That is the spirit which has provided the school, and which undoubtedly will make it the success it merits.

The work over which the Canadian Domestic Engineering Co. had control amounted to $350,000—comprising 22 separate contracts, covering almost every phase of the mechanical trades, as well as for chemical and physical laboratories.

The bulk of the electrical apparatus throughout the school has been furnished by the Canadian Westinghouse Company, Limited, whose factory is located at Hamilton, Ontario.

This material includes the engine driven generators in the engine room and the motor generator set in the same; general laboratory equipment, including motors, transformers, high voltage testing transformers, etc., together with five panel switchboard for operating the three physical and electrical laboratory circuits; motors for driving woodworking machinery, machine tools, printing machinery, cupola blower, pumps, ventilating fans, etc. The bulk of the motors supplied for operation on direct current circuits have been of the latest interpole construction and are distinctly Canadian; the same being known as the

Type "SA" motor. Altogether probably seventy-five motors of this construction are scattered throughout the building.

ILLUMINATION.

"In the lighting of the Institution the Architects have so laid out the combination of fixtures and lighting units as to get the greatest possible efficiency in the distribution of the light. In all cases where direct lighting is employed frosted lamps are used. This arrangement softens the light and prevents eye strain."

About 1700 lamps ranging from 25 watts to 250 watts are installed. These are all Westinghouse Mazda lamps.

Besides the above, the illumination is almost entirely taken care of by Westinghouse Mazda lamps.

The electrical machinery in the power plant is composed of three direct current, 3 wire engine driven generators of the follownig sizes:—

One 250 K. W., 375 R.P.M., interpole Type "Q" Generator.

One 100 K. W., 150 R.P.M., interpole Type "Q" Generator.

One-50 K. W., 275 R.P.M. non-interpole Generator.

The first two represent the most modern construction of cast steel frame generators of this type.

In addition to the above, an auxiliary system which is coupled with the Hydro-Electric Service consists of:

One-75 K. W. motor generator set driven by 110 H. P. 25 cycle motor.

An inspection of the above machines is sufficient to show the high standard of quality maintained by the Canadian Westinghouse Company in all its output.

For testing purposes in the physical and electrical laboratories most of the equipment has been supplied by the Canadian Westinghouse Company, and consists of service transformers, one 12,000 volt testing transformer, induction motors, rotary converter, crane motor, etc.

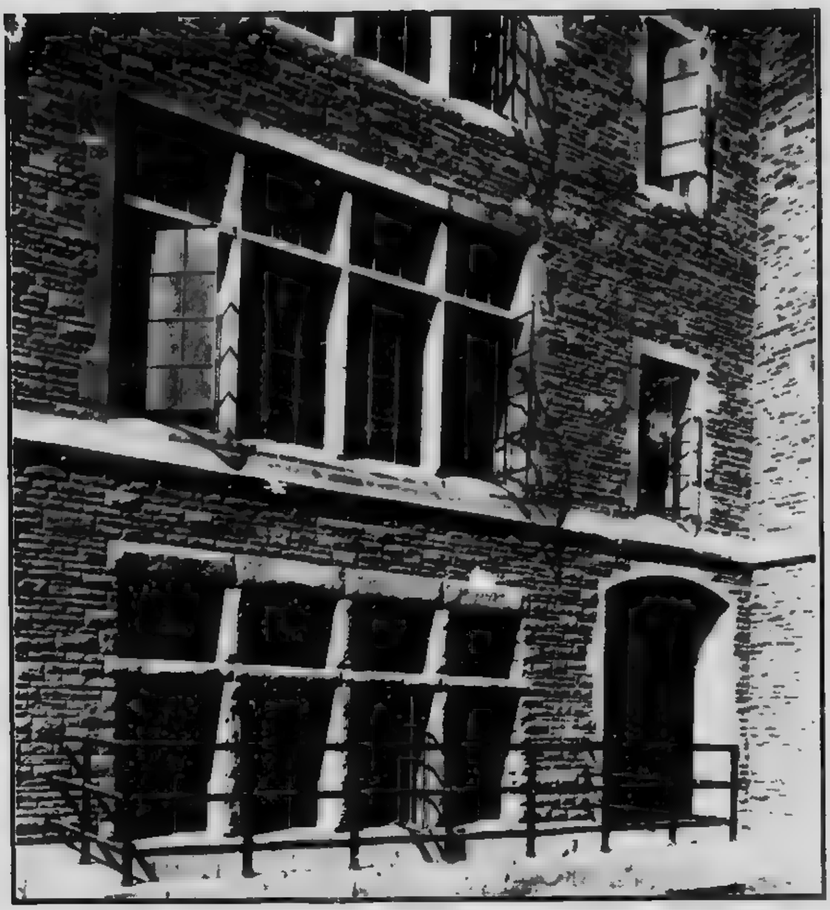
Besides the above, the laboratory services are controlled through a Westinghouse switchboard consisting of five groups; each group being comprised of three individual distribution panels; the whole being enclosed by sheet iron partitions under lock and key.

The woodworking shops throughout have been equipped almost entirely with Westinghouse Type "SA" direct current interpole motors with enclosing covers for protection against dust, etc. In all about thirty of these motors are used in this department of the school. The sizes of motors supplied vary from 2 H. P. to 20 H.P., and in addition there have been two vertical direct current motors for use on the mortisers.

In most cases the drives on the machine tools, etc., have been undertaken by Canadian Westinghouse Type "SA" motors, either constant or variable speed. These motors, on account of their rugged construction, are extremely satisfactory for this heavy duty service, and besides the above, smaller motors of the new Type "CD" construction have been supplied. A number of the machines mentioned above are equipped with automatic control to take care of speed variations required by the machine tools which they operate. The Printing Department is also equipped with several motors of the Type "SA" and Type "CD" construction.

The cupola blower in the Foundry is driven by a 10 H.P. enclosed Type "SA" motor.

In addition to the various motors mentioned above there have been supplied throughout the building a number of Type "SA" motors on pumps, Sirocco ventilating blowers, Armstrong's general plumbing equipment, etc.



SASHES BY HENRY HOPE & SON. STONEWORK BY REES & HAWKINS.

Keith's Limited were entrusted with some large contracts. They have completed the thirty miles of wiring, all run in drawn steel conduit. In addition they did the wiring for the motors (and fixing the same) in the Model Shops, for the Electric Clocks, Call Bells, Fire Alarms, and for the Telephone System.

They also had the work of the Refrigerating Plant, which, by the way, is controlled by 12 ton machine (Trick Co.) specially designed for the school to operate the Brine system which is the means adopted for cooling the big boxes and refrigerators (doors and fronts by the Eureka Co. Ltd.)

The refrigerating plant is used for making blocks of ice and for supply for the careffas to be used. Other details as to Keith's work will be found later in the write-up to the engine room. Their work has been well done.

Sheldon's, Limited, supplied the main ventilating fans and laboratory ventilating fans and the engine for same. The total capacity of these fans is 180,000 cubic feet of air per minute.

The Canadian General Fire Extinguish Co., Ltd., had charge of all vent work for heating, as well as all piping in connection with the power plant. There are 50,000 feet of direct radiation—which latter is used to heat the air for ventilation throughout the building.

Before commencing a review of the interior of the school attention is directed to the fine example of stone work. All the exterior stonework was fixed by Rees & Hawkins, General Building Contractors, of 705 Manning Avenue, Toronto, well ahead of time and in nine months actual working, which would have been still further reduced had not at times conditions prevailed over which the masons had no control. The approximate quantity of stone thus used amounted to 27,000 cubic feet. Fine specimens are to be seen at the entrances, especially at the Tower entrance.

A close inspection of the work done will reveal the fact that praise is due for quality of execution.

The cut stone was supplied by Geo. Oakley & Son, of Toronto.

Technical Education: Progress in Ontario.

Technical Education in the Province of Ontario commands more interest from year to year. As shown by the yearly reports received, the growth of the system has been rapid and results most gratifying, new schools being built in the cities and the organization of classes in towns and villages. It offers opportunities to the pupils attending day school and to the mechanic who wishes to increase his knowledge and improve his skill in his particular trade.

Classes are also conducted for women's work. It is of interest to know that the evening classes, taught by able and skilful mechanics, are composed mainly of apprentices and journeymen from the various industries, located in the following cities: Brantford, Galt, Guelph, Hamilton, London, Ottawa, Port Arthur, St. Thomas, Stratford, Toronto and Windsor.

Classes in Home Industry, such as millinery and dressmaking are largely attended by women wherever classes have been organized. It is noted that students at evening classes lack the elementary public school education, which fact is a serious drawback to the progress of evening class instruction. The number of pupils that leave the public schools without a definite aim in life is very great, and one would infer that the industries are supplied by those who leave school from the Forms II and III.

In perfecting a system whereby Ontario must train her rapidly increasing school population, efforts are being made to draw the pupils' attention to their need of Technical Training. In the High Schools of the Province, located in the mining sections, mining departments have been established. These schools provide academic and technical training suitable to needs of sections. The organization of industrial and technical education under the Education Act of 1911 began with the establishing of evening classes. The securing of properly qualified teachers and instructors from the day schools, accommodation and equipment helped materially in the management of evening classes. A hindrance to the proper development of Technical training in villages is caused by the inability to secure teachers. The Inspector of Industrial and Technical Education is of the opinion that in order to develop a system that would provide proper training in small towns and villages, a grouping of schools, and employing of itinerant teachers would be necessary. Evening schools, while being important and quite necessary, are not considered as fulfilling the wants and needs of Day Industrial Classes. Numbers of boys and girls attend the day school for technical training who have not any interest in the evening schools. It would seem, therefore, that day schools must be relied upon with a view of incorporating vocational training in the later years of the course.

A course of this training assists the pupil to choose the vocation he is to follow. Upon the organization of industrial day schools local needs will have to be considered. For those whose circumstances permit, pupils at the age of fourteen will be provided with full day instruction, while those who have to support themselves may train under the co-operative industrial classes in which the pupils receive instruction part of the time and remain at work part of the time.

Boards that have established evening schools are now considering the organizing of industrial day schools. With the assistance from Provincial and Dominion funds it is felt that the Industrial and Technical Education will be placed in the position where its benefits will be felt.

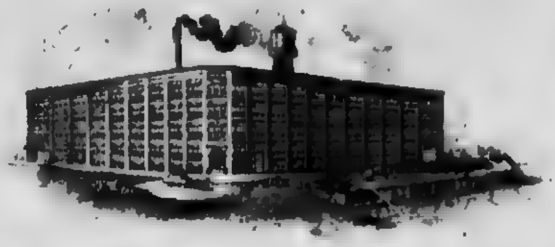
Technical and Industrial day schools shew by the table compiled by the Inspector of Technical Education, Dr. F. W. Merchant, that the number of pupils attending the general Industrial classes is four hundred and forty-four, while there are thirty-four places listed in which technical training is given.

The steel sashes throughout the building, nearly 2,000 in all, were supplied by Henry Hope & Sons, of Canada, Limited. The Hope Company of Birmingham stand as pioneers in steel sash making. The three-point contact and sections of solid Mill Rolled Steel with superior finish of their casement sash—a special feature of the Hope Sash—makes it impossible for dust or rain to penetrate. All the casements, as well as sash are made to insure the maximum amount of ventilation. (The types of sash made by Hope's are of a very wide range, including casements of all patterns, suitable for anything from a cottage to an office building). The gun-metal hardware supplied is also a special feature of the Hope sash, and includes a range large enough to suit any requirements.

The Factory Sashes in the 2 Light Courts (650 in all) were made in Hope's new factory in Peterborough, Ont., and are acknowledged to be the best steel sash on the market.

The cut on page 10 gives a good idea; it shows casements and sashes on the east side of the school.

All the plumbing and sanitary work of this School has been well executed by Fred Armstrong Co., Limited, of 277 Queen St. West, Toronto. Photographs are on exhibit showing how the work progressed and from these it will be seen how the plumbing was in position and fixed ahead of the floors, and in some instances of the outer walls. The whole contract—a large one—was completed to the satisfaction of the Advisory Board and the Engineers.



THE BERLIN INTERIOR HARDWOOD CO.
BERLIN, ONTARIO

Manufacturers of—Seating for Theatre, Lodge, Church, Auditorium and Assembly Halls, Domestic Science, Manual Training Furniture, and Laboratory Equipment.

The Adams Furniture Co., Ltd.

Contractors for School, Office and Home Furnishings

Estimates and Illustrations
Furnished on Request

Consult our Contract Dept.

Adams

ELEVATORS

—IN—

The New Central Technical School, Toronto

WERE INSTALLED BY THE

Turnbull Elevator Manufacturing Co., Toronto

Manufacturers of High Grade Passenger and Freight Elevators

The Iron and Steel Piping used in this building was supplied by the Page-Hersey Co., of Toronto. Though most of the piping is hidden, some interesting sections are to be seen suspended under the ceilings in the Toilet Rooms and in the Shower Baths adjoining the Gymnasium.

DRINKING WATER.

The water throughout the building is re-filtered after coming in from the city main; it is then passed through a cooling tank, cooled to proper temperature, and circulated to the various fountains. Water is always in circulation. There are two fountains on each floor mounted on elaborate marble stands.

GAS HAS MANY USES.

Artificial Gas finds ample opportunity to prove its superiority as a heating agent in the domestic, manufacturing and industrial departments of the school's work.

Over one hundred individual gas hot plates are used in the Domestic Science kitchens of the schools.

Eleven Cabinet Gas Ranges of improved manufacture have a place in the kitchens connected with Domestic Science work.

A Cabinet Gas Range is installed in the kitchen of the Model Housekeeping

Gas outlets are placed on all the demonstration tables in six of the lecture rooms.

Gas lighting brackets are placed in all the corridors and halls of the building.

Gas heating forges and hardening furnaces are used in the Forging Shop. Glue pots are also heated by gas in the Woodworking Shop.

A Gas Engine has a prominent place in the Engine Laboratory.

Gas is also used in the Physical, Metallurgical and Chemistry Laboratories.

The cleaning of the school is accomplished by means of the well known TUEC system. The installation is divided into two parts, each part being handled by means of a four-sweeper 6½ H.P. TUEC machine, thus making an eight-sweeper plant in all.

There are 220 valves in the building to which 50-foot hose lengths can be attached, and the system is of such size that eight men can clean the building simultaneously without overloading the machines.

The TUEC Stationery Cleaning System has been installed in hundreds of schools on the continent, but the Technical School of Toronto is the largest school cleaning installation. The United Electric Company, the manufacturers of the TUEC, have their factory in Toronto.

THE POWER PLANT ANE HEATING AND VENTILATING SYSTEM.

The heating of the building is the work of the Canadian General Fire Extinguisher Co. Limited, and is accomplished by forced hot water circulation partly direct and partly indirect, all steam being condensed in heaters in the pump room, circulated by two DeLaval Steam Turbines, distributed through mains and recirculated after being re-heated. The heating is controlled by a system of temperature regulation, which automatically keeps the air at the desired temperature, by means of compressed air forced through ⅛ inch pipes, and ventilators automatically open when the temperature is too high. Thermometers in each room are connected with a control-board in the engine-room, which is only about 2 feet square and yet controls the whole system. The ventilation is divided into two parts, one for each half of the building. In each part the outside air is first passed through tempering coils to warm it slightly, then through a Buffalo Forge air washer to take out the dust and put in the necessary moisture, then through heating coils to bring it to the proper temperature, then through a fan which forces it into the main air ducts The temperature of this air is regulated by automatic thermostats which operate butterfly dampers. In addition there is a system of direct hot water radiation in the rooms also controlled by automatic thermostats.

DESCRIPTION OF INTERIOR.

Commencing now the inspection of the interior of the school naturally the lead is to the Principal's office. The Principal's office, which is also used as a Board room, and the adjacent room used by the Treasurer and Bookkeeper, are conveniently situated immediately to the north of the main entrance on floor B.

The Assistant Principal's office, with the telephone switchboard and stenographer's desk, is situated immediately to the south of the main entrance. Each of the eleven directors also is provided with an office conveniently situated with respect to the work of his or her department.

Before proceeding to the Basement and Engine Room, a study of the well thought out Auditorium must be made. The Architecture, Harmony and Finish at once attract notice. The Auditorium with its gallery, which is opposite the main entrance, extends through floors B and C, and provides individual seats for 1300 people.

The fine plastering is the work of D. C Dancy, the decorations by Hughes & Co., electric light and fixtures by Murray-Kay Limited, the platform furniture (lecturn and reading desk) by Canada Office and Furniture Co (through Hendry's), and the chairs by the Berlin Interior Hardwood Co. (see announcement).

The visitor is bidden to note the general character design of the furniture throughout the school, and it is a pleasure to be able to place on record the fact that the designing is the work of a member of the staff, Mr A. J. Stringer, under the supervision of the Principal.

The Students' Tables in Class Rooms are a special feature in this School, and were supplied through C. A. B. Jennings. The Students Desks were supplied, through the G. M. Hendry Co., by the Canadian Office & Furniture Co. Limited. The Chairs throughout are of a heavy design, reinforced with steel rods, and were supplied by the North American Furniture Co., through the Adams Furniture Co. The Students' Stools, which are reinforced with iron rods, were made by the Berlin Interior Woodworking Co. The Benches distributed throughout the building were supplied by the Robt. Simpson Co., being made by the Elmira Interior Woodworking Co.

ELECTRICAL AND GAS EQUIPMENT.

The entire Electrical, Gas and Vacuum Piping and equipment for all Laboratories, Tables and Desks in the various Science Rooms are the work of A. R. Rice & Co., of Toronto, and it is of interest to note that all material for their equipment was made in Toronto.

A descent of a few stairs and the Basement, or Floor A, is reached. Immediately the first rooms to be seen are the two set apart, each 54 ft. by 28 ft. (as designated on the plan), for Manual Training, i.e., elementary carpentering and general woodwork.

Adjoining is the Electrical Construction Room. Here embryo electricians will learn to use stocks, dies, soldering and other tools. They will wire partitions representing walls and floors. Other trades also will receive their quota.

Leaving the Electrical Construction Room, one of the entrances from Harboard Street should be viewed, and then on to the Applied Mechanics Laboratory. The equipment here includes a 30,000 pound testing machine for tensile transverse and compressive tests, a 300,000 pound machine for compressive and transverse tests on brick and cement blocks supplied by the Toronto School Supply Co., a strain indicator, by Canadian Fairbanks Morse Co., a tension machine and other appliances for cement testing, three autographic recorders of stress-strain diagrams, three simple tension testing machines for wire, through Hendry's.

The Clay Products and Brick Shops may be taken together, as the generosity of the Clayworkers' Association has rendered these two rooms well equipped and interesting. The machinery supplied by this Association includes a machine for brick, tile and hollow-ware, and another machine for dry press work, with all the necessary kilns. It is a privilege of the writer to be able to state that additions will be made to this plant from time to time. The bricks, tiles, etc., will be used in the Construction Room, on the houses periodically to be built and equipped by the students.

LOCKER ROOMS.

There are nine locker rooms, furnished with one thousand steel lockers, by Dennis Wire and Iron Co.

TOILET ROOMS.

On each of the floors except floor B there are two students' toilet rooms, providing sufficient accomodation for two thousand students. Here special attention is drawn to the excellent plumbing of the Fred Armstrong Co. Ltd. The high grade porcelain fixtures are equipped with the latest type of valves and have shut off valves on all water pipes.

These rooms present a neat appearance, but at the same time suitable equipment for the Technical School work has been the main consideration. There are six of these main toilet rooms on the different floors, and a large number of smaller toilet rooms for use of the staff.

DYNAMO AND MOTOR LABORATORY.

This laboratory, 49 x 28, is equipped with a testing transformer, by Can. Westinghouse, five ordinary transformers, 2 Jones & Moore and 3 Can. Westinghouse, two induction motors, one rotary converter for one, two and three-phase alternating current, by Can. Westinghouse; one A.C. motor generator set for one, two and three-phase alternating current, by Swedish G. E. Co.; one series crane motor; two D.C. motor generator sets, by Can. G.E.C.; for additional motors and dynamos, 2 Can. G.E.C., 1 Can. W.E.C., 1 Toronto E. Light Co.; a complete set of A.C. and D. C. voltmeters, ammeters, wattmeters; a power factor meter, by Weston E.I. Co.; a tachometer.

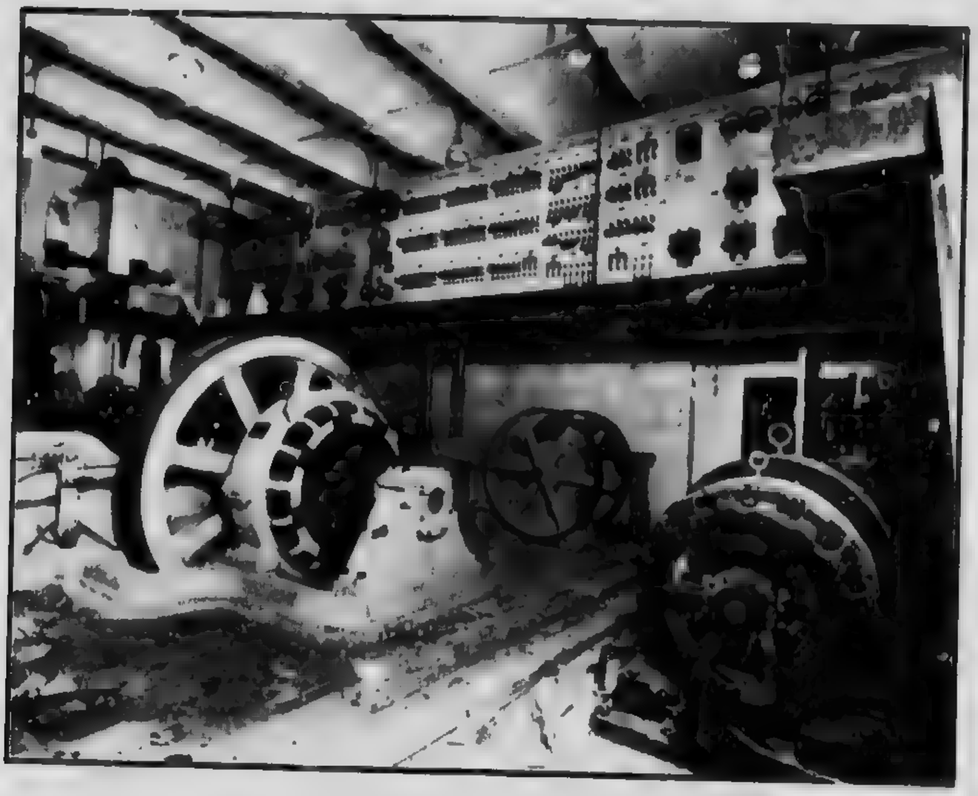
The Plumbing Shop contains necessary equipment and tools. Here the students will learn the preliminary work incidental to gaining experience in the Construction Shop.

Next an interesting room is reached in the

STEAM AND GAS ENGINE LABORATORY

The equipment includes a plain slide valve steam engine, with special eccentric fas- slide valve engine, with special eccentric fastenings for quick adjustment in valve setting; an automatic engine with an inertia governor and an adjustable plate on the flywheel for quick adjustment in valve setting; hollow pulleys, water and drain pipes, and prony brakes attached to each of these engines; a steam turbine arranged to be readily taken apart for examination, and equipped with a brake; a surface condenser arranged for connection to either of the engines or the steam turbine; scales and tanks for weighing the condensed steam; a gas engine; a valve setting model; and a supply of testing instruments including steam and gas engine indicators, calorimeters, tachometers, thermometers and gauges. Machines for this shop were also supplied by Petrie, Ltd., A. R. Williams Co., Can. Fairbanks Morse and Hendry's. The Goldie & McCulloch Company are installing a small 15 H.P. steam turbine for experimental purposes in this laboratory. This unit is small so as to be specially adaptable for operation by the students themselves, and is equipped with special devices for testing work, and may be run at varying speeds. It is of the impulse type, and is the same construction as used by the Goldie & McCulloch Company on their larger turbines throughout the Dominion.

Then next for one of the many surprises of this splendidly equipped school—



CANADIAN WESTINGHOUSE MOTOR GENERATORS IN THE ENGINE ROOM.

THE CONSTRUCTION ROOM.

This room is 80 feet long, 27 feet wide and 30 feet high, affording ample space for the erection of two moderate sized dwelling houses at one time. In this fine room students will have opportunity to work in concert in the erection, complete in all details, on actual dwellings, here carrying on the lessons learned in the elementary shops. There is an observation gallery accessible from floor B. A power woodworker is provided in this room.

The Gymnasium, 90 x 48, claims more than a passing notice. It is well equipped with modern apparatus and provides ample space for class drill. There are two adjoining rooms, one the Instructor's office, and the other the Armoury. A running track, banked and 20 laps to the mile, will be well used. Adjoining are Plunge, Showers and Dressing Rooms. The plunge, 50 x 25, is lined with glazed tile, and is supplied with filtered water and with the latest equipment. The water is continuously drawn from the bottom of the plunge, put though a large filter, heated to the correct temperature by an automatically controlled heater and pumped into the plunge again. This filtering apparatus is kept in continuous use so that the water is exceptionally pure and at the right temperature. Provision is also made at the plunge for aerating the water.

There are twenty-four showers, and forty dressing rooms. At the entrance to the plunge bath are located these shower baths, equipped with nonscalding mixing valves, practically eliminating the chances of students being scalded by the hot water. The showers may also be turned on before entering the compartments. In the four corner compartments "needle" baths are supplied as well as showers.

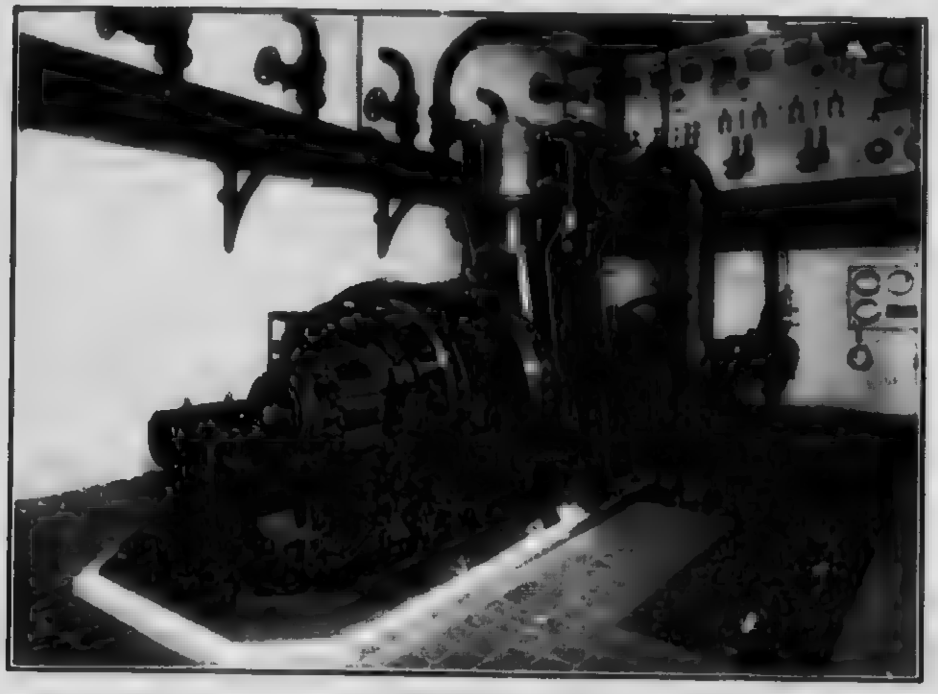
Next a visit to the Foundry. The Foundry is equipped with a cupola, three brass furnaces, one core oven, a pneumatic rammer, 3 moulding machines, a ladle heater, flasks and small tools.

Foundry Overhead Travelling Crane was supplied by the Herbert Morris Crane & Hoist Co., of Toronto.

After this is seen the Forge. This room contains twenty forges, a gas-heating forge and a gas-hardening furnace, one power hammer, a rivetting hammer, pyrometers for heat treatment of steel, and the usual tools.

MACHINE SHOP.

The machine shop, 57 x 57, contains sixteen plain engine lathes, five tool-making lathes with relieving attachments, one speed lathe with centering attachment, and one precision lathe. Some of these lathes are driven by variable speed motors. The equipment also includes one planer, 26 in. x 26 in. x 6 ft. with variable speed and reversing motor drive, four shapers, two universal and two plain milling machines, four grinders, including plain cylindrical, universal and cutter grinders; one drill grinder, one twelve-



inch heavy duty drill with compound table, one sensitive drill, one die-slotter, one power press, one arbor press and the necessary micrometers and other tools.

PATTERNMAKING AND WOODTURNING SHOPS.

One of these is equipped with eleven lathes, a trimmer, a jointer, a band saw, a variety saw, a mortiser, and a tool grinder, twenty benches and sets of small tools. The other contains one twenty-inch motor head block patternmaking lathe with power feed, six twelve-inch motor head block lathes, one band saw, one universal saw table, a jointer, a disc and spindle sander, a trimmer, and twenty benches and sets of tools, supplied by the British American Hardware Co. Most of the lathes were supplied by the Preston Woodworking Co. Limited.

CABINET SHOP.

This shop is equipped with a jointer (Preston W.W. Co.), a mortiser, a tenoner (Cowan), a variety saw, a trimmer (Rudd-Bulnap M. Co.), and twenty benches, through Robt. Simpson Co., and small tools for twenty students.

MILL ROOM.

This room is furnished with a thirty-inch cabinet surfacer (Am. W.W. Machine Co.), a sixteen-inch jointer, a rolling-table cut-off saw, a self-feed rip saw, a band saw, a belt sander, a shaper, and a drying room 11 x 18 x 14.

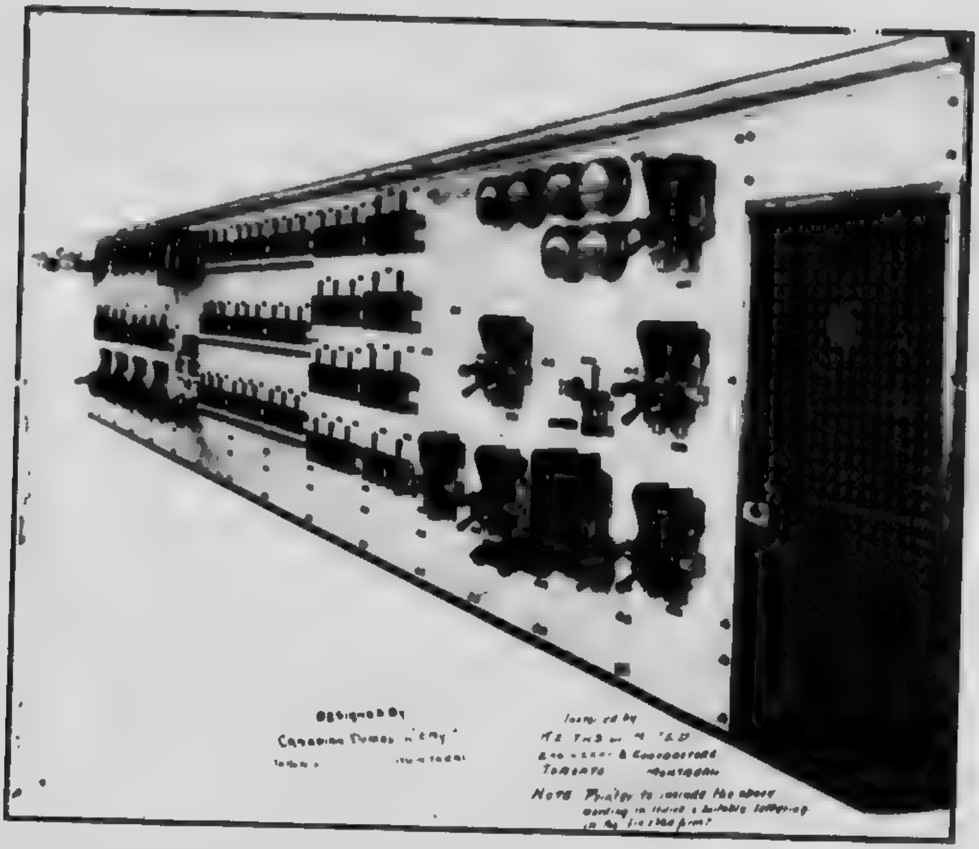
Nearby is the Carpentry Shop, the equipment of which includes a variety saw with mortising attachment, a jointer, twenty benches and sets of tools, supplied by the British American Hardware Co.

ENGINE ROOM AND POWER PLANT.

In designing the power plant, the Engineers kept in mind the fact that this power plant was in a Technical School and was to be used for demonstration purposes as well as for developing power. For this reason the units were selected to show to the students the [illegible] types of machines in use at the present time and almost every unit is of a different type. In accordance with this plan a Goldie & McCulloch Vertical Enclosed Forced Lubrication Quick Revolution Engine, directly mounted on a common sub base with a 250 k.w. direct current generator was selected as one of the latest types of prime movers. This engine has a high pressure cylinder 16 inches in diameter and a low pressure cylinder 25 inches diameter, with a stroke of 10 inches and a speed of 375 R.P.M. It has its working parts, with the exception of the flywheel, entirely enclosed in an oil tight frame, and all the pins and bearings on the engine are supplied with a copious stream of oil under pressure. The cranks are set opposite one another, and the reciprocating parts of the high and low pressure sides are carefully checked so that they weigh exactly the same. This arrangement practically balances the reciprocating parts and eliminates vibration at high rotative speed.

The governing is accomplished by throttling at minimum cut off (approximately half stroke) up to about three-quarter's load. From this up to full overload the cut-off is gradually increased to suit the load.

The engine runs non-condensing, and is specially designed for superheated steam and high pressure. (See cut on opposite page.)



A smaller unit showing an engine in common use at the present time consists of a single cylinder Goldie & McCulloch centre crank "Ideal" Engine directly connected to a 50 k.w. generator. The engine runs under the same steam conditions as the vertical engine and at a speed of 275 R.P.M. This engine is also of the enclosed type and oiled by the splash system, and has a cylinder 10 inches diameter by 12 inches stroke.

The engine room is equipped with a 125 horse power D.C. three phase induction motor directly connected to a 3-wire D.C. generator of 75 k.w., supplied by the Canadian Westinghouse Co.: a 365 horse power vertical high speed engine of the combined throttling and cut-off type directly connected to a three wire D.C. generator of 250 k.w., supplied by the Canadian Westinghouse Co.: a 150 horse power Corliss engine, supplied by the John Inglis Co., and directly connected to an interpole, three wire D.C. generator of 100 k.w.; a 75 horse power horizontal engine of the fly wheel governor type directly connected to a three wire D.C. generator of 50 k.w.: a switchboard carrying the necessary rheostats and circuit breakers and a complete set of measuring instruments; a single stage air compressor directly connected to a steam engine furnishing air at 80 pounds per square inch: a cold brine circulating system which is cooled by ammonia from a single acting vertical ammonia compressor directly connected to a horizontal steam engine with Meyer valve. The brine is used to cool drinking water and refrigerators and to manufacture ice. The steam for all engines, pumps, and turbines is collected and utilized in the heaters.

Most of the motors throughout the building were supplied by the Canadian Westinghouse Co., two of which can be seen in the cut opposite. The bases for the engine beds are the work of A. J. Penberthy, office and yards at 292 Booth Ave., Toronto, and some can be seen in the photograph opposite.

Before leaving the engine room the strictly technically versed visitor may be invited to make a close inspection of the switchboard.

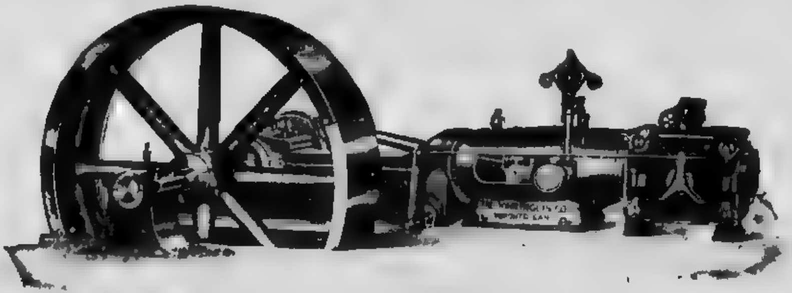
The writer never has seen a board put to better use—he has seen many half as large again with no bigger load to carry. Its lay out testifies to some clever thinking on the part of its designer, Mr. Harry H. Angus, of Toronto. That board, of which a picture is given, controls four main and six groups of 55 branch circuits, a total of 500 k.w.

To the lay reader a better idea perhaps will be conveyed when the control stands for a total candle power of 550,000 by means of thirty miles of cable and wire distributed to 2,000 lighting fixtures, 1,800 supplied by Keith's, Ltd., and 200 specials by Murray Kay Co., Ltd.

INGLIS Products are Made in Canada

When a Reliable Corliss Engine was required by the **Toronto Technical School** for power purposes and as a **Standard** for Student Instruction, testing, etc., the engine specified was an "Inglis" Corliss Engine.

The **"Old Reliable"** Corliss Engine is right up-to-date, and is universally recognized as the **Standard Corliss Engine** for durability, economy, ease of handling, and first class workmanship.



Inglis Corliss Engine. Write us stating your needs.

THE JOHN INGLIS COMPANY, Limited
Engineers and Boiler Makers
14 STRACHAN AVENUE, - - TORONTO, CANADA

The switchboard is the joint work of Keith's, Ltd., Northern Electric Co., Ltd., Canadian Westinghouse Co., Ltd., Weston Electrical Instrument Co., and the I. E. T. Circuit Breaker Co.

The power plant is under the control of Director of Engineering, M. L. Smith, with Mr. Kirkaldy as engineer in charge.

The classes in power plant maintenance and operation will be arranged to utilize to the fullest the advantages offered by the greatly enlarged and improved laboratory and power plant equipment provided by the new school. The objective of this important department is to furnish only such instruction as will be of practical use and interest to the students involved. These will include engineers and firemen in the making; practical engineers and firemen of mature experience but who have not had an opportunity to gain technical knowledge or experimental practice, and men in any way connected with manufacturing enterprises, to whom the choosing, and maintenance of power plants is of vital importance.

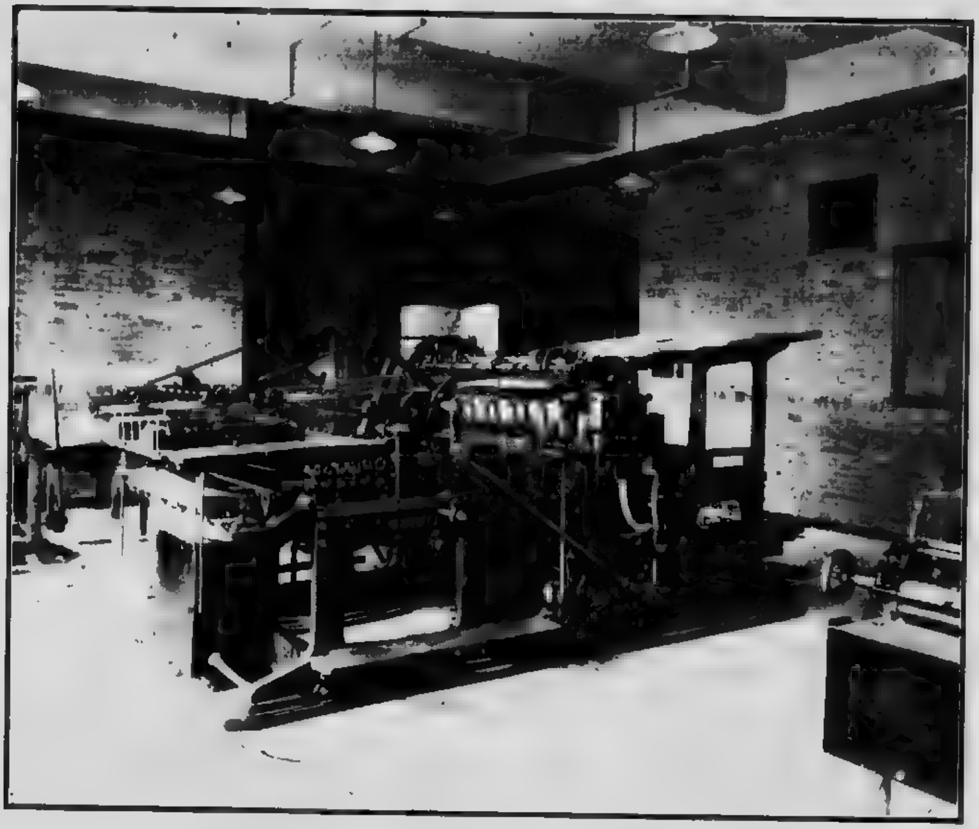
These classes will be graded as far as possible into small and harmonious working groups, and the men will be required both to perform their own experiments and work out the results obtained. As little time as possible will be devoted to the older and more or less obsolete types of appliances, and up-to-date practice will be illustrated, as far as possible, in a practical way. The whole plan stated in brief is to provide for the man who works, an education, equal in every sense to an expensive technical training without the German and the fancy mathematics.

The fan room equipment also includes two engines for driving the fans, and a motor-driven exhaust fan for drawing off the gases from the forge shop.

The boiler room contains four B. and W. water tube boilers with nominal rating of 750 horse power, provided with chain grate stokers.

The pump room equipment contains an exhaust steam feed water heater with two independent pumps either of which could supply all the water for the boilers, a live steam injector as an additional emergency supply, an exhaust steam heater and a live steam heater for the water used to heat the building, a separate feed pump to collect the condensation from the latter heater, two centrifugal pumps operated by direct connected steam turbines for circulating the water used to heat the building, a heater for the water used in the laundry, a continuous filter for the water used in the swimming tank These heaters and pumps may be used independently or in combination.

The steam and refrigeration systems are furnished with a very complete set of apparatus for operating tests of the plant, including thermometers, steam and water flow meters, draft gauges, pyrometers, steam calorimeters, steam engine and ammonia indicators, coal scales, gauge tester and barometer.



CLAY AND BRICK SHOPS.

Returning to floor A or Basement, the Brick Shop is the next, a description of the equipment of which is coupled with the Clayworkers' Shop.

Next is Stone and Cement Shop, and here the equipment provided should ensure thorough practice.

Plaster and Decoration Rooms. Here students will have the work of primary training before proceeding to the advanced shops on Floor B

Here is the Assembly Room, a description of which will be found when Floor B is described.

As an indication of the needs of the age, provision is made by a Bicycle Room, 34 x 46, situated near the Assembling Room for boys on Floor A, equipped with racks to accommodate 400 bicycles.

PRINTING ROOM.

A Bookbinding Room is adjacent to the Printing Shop. Three years ago the Board took steps to assist the printers by opening an apprentices' School of Printing as a department of Toronto Technical School. The School has been a success, and to-day the result is seen in the necessity for the provision here providing an equipment costing $15,000.

A Composing Room 48 x 33 feet, with large north and west window areas, is equipped with thirteen Tracey Cabinets eighteen Type Racks, and a large Steel Top Imposing Stone.

The Press Room, 56 x 28 feet, contains a No. 3 Miehle Press, a Colts Armory Press, a Phoenix Press, a Gordon Press, a 38 inch Crosland Automatic Power Paper Cutter, a Hand Paper Cutter, a Folding Machine. The Miehle Press is illustrated above.

An adjacent Stock Room provides space for necessary supplies and printed matter.

In the printing department, 56 x 28, care has been taken to select such machines as are mostly used in the large offices throughout the trade, so that students, after finishing their training, can take a position and find those machines with which they are familiar. After carefully looking into the merits of the different machines on the market, and having regard to the numbers in use, there have been installed:

A No 3 two-revolution four-roller Miehle Press, which prints a sheet 33 x 46, at a speed of 2,100 per hour, and if desired, slits the sheet into two at the point of delivery.

A Model Five "C" Colts Armory Platen Press for fine half-tone and full-size type forms, a Phoenix Press, a Gordon Press, a 38 inch Automatic Power Paper Cutter, a Hand Paper Cutter,, completes the list. All machines are separately driven by Diehl Motors.

Snow White Enamel

AFTER years of experimenting we have produced what we consider one of the finest SNOW WHITE ENAMELS ever placed on the market. It works free and easy, has great covering capacities, and does not brush mark. It is made in the following finishes :

SEMI-FLAT
HIGH GLOSS, and
EGG SHELL

Write for samples and prices.

The Ault & Wiborg Co. of Canada, Ltd.

VARNISH WORKS
MONTREAL TORONTO WINNIPEG

COMPLETE
PRINTING
PLANTS
Commercial and Amateur

ANGLO-CANADIAN TYPE & MACHINERY CO., Limited, Cor. Adelaide & Spadina, Toronto

Printing Inks, Lithographing Inks,
Printer's Rollers,
Padding Gum, Varnishes and Dryers.

Made in Canada for the best Canadian Printers.

Canada Printing Ink Co. Limited
15 Duncan St., Toronto, Ont.

A Mentges Job Folder, which folds sheets varying in size from 9 x 12 down, and delivers them at the third or fourth fold as desired.

Two Security Adjustable Tube Roller Cabinets are also provided to keep the composition rollers for the different printing machines in working condition all the time.

The Composing Room, 48 x 33 feet, is equipped with the latest faces of Type, Borders and ornaments from the American and other Typefounders' catalogues, and the most labor-saving devices and tools have been procured. It has a large steel-top Imposing Stone.

The "Crosland" Auto-Clamp Paper Cutter is a British-built machine. It has that strength, rigidity and precision of action and accuracy so necessary to a fast modern paper cutter. Its mechanical design embodies the very latest practical and scientific principles. The machine is exceedingly powerful and accurate, runs noiselessly and takes but very little power to drive. Notable amongst the labor-saving features are the changing and replacing almost instantly of both knife and cutting-stick. The knife has no screws or bolts to cause loss of time, being held firmly in position by an ingenious and yet simple method. The changing of cuttnig-stick needs neither screw pin or wrench, the operation being simply the turning of two conveniently-placed hand screws.

The "Crosland" Auto-Clamp Paper Cutter is a worthy addition to the other up-to-date and modern machinery installed in the new Technical School. It was supplied by The Anglo-Canadian Type & Machinery Company Limited, Toronto.

Two Wire Stitchers and a Van Bosser (for embossing), complete the equipment.

The Ink used in the School is made by the Canada Printing Ink Co.

Painting and Decorating Shops. — Two large demonstration rooms with a store room and a model paint shop, are assigned to the Painting and Decorating trades. They are furnished with tables, stands, stools, step-ladders, and the supplies and equipment for advanced work.

And this completes as well as time and space will permit the description of Floor A, and on returning to Floor B, a glance at the Library and Reading Room, 54 x 28 feet, conveys some idea of the thoroughness of the means provided for the students. The room is near the main entrance, and is furnished with ample shelving, desks, and tables designed in the school.

Elementary Physics.— In these rooms both hot and cold water are supplied to every sink,as well as compressed air to some tables and draft hoods for removing gases. All waste pipes are of special construction to prevent destruction by acids, and care has been taken to see that all pipes are readily accessible, and to shut off water immediately to any one section, in case sinks become clogged or taps become damaged.

Special Laboratory Tables in this room were fitted by A. R. Rice & Co.

Gas and electrical connections supplied by the A. R. Rice Co., of Toronto.

Physical Laboratories.—On floor B there are four laboratories, two equipped for general physics, and two for special work in electricity and light. These rooms are all provided with special low-voltage direct currents as well as with the usual alternating and direct currents. Wiring to tables from switchboards is the work of A. R. Rice Co.

Gas and electrical connections supplied by the A. R. Rice Co., of Toronto.

Assembling Rooms.—There are three of these, one on Floor A for boys; two on Floor B, one for boys and the other for girls, and between the two last mentioned is the Supplies Room, where books and stationery may be purchased. These Assembly Rooms have been provided to give the students an opportunity of resting and preparation of lessons, instead of having to wait, maybe in the rain or snow.

Supply Room. This room is situated between the Assembling Rooms on Floor B, and furnishes opportunity for the students to buy their supplies.

Lecture Rooms. There are five Lecture Rooms, one with seating capacity for 200, the others each accommodating about 100. Each room is provided with a projection lantern, supplied by Hendry & Co., and a science lecture table, fitted by A. R. Rice & Co., Gas and Electrical supplies.

Mathematics Laboratory.—This laboratory is furnished with mathematical instruments of precision, such as transits, levels, surveyors' compasses, sextants, chains,plainmeters, pantagraphs, slide rules, calculators, barometers, anemometers, rain-gauges, altimeters, micrometers, and models for geometery and mensuration. In this room are kept the astronomical globes and an equatorial telescope. The room is sufficiently large for class instruction.

Mathematical Instruments for this room were supplied by the Art Metropole (branch in Toronto of the Hughes-Owen Co., of Montreal).

Gas and electrical connections supplied by the A. R. Rice Co., of Toronto.

Class Rooms.— There are thirty Class Rooms fitted with individual desks or tables, and movable chairs. Each room has ample blackboard space, with a double sliding blackboard behind the teacher's desk. The blackboards are all of slate. Six of these rooms are furnished with science lecture tables, fitted with gas and electric connection and hot and cold water.

Cloak Rooms.—There is a cloak room in connection with each class room, providing accommodation for all regular students.

In passing along the corridor 'tis well to take a glance from the gallery of the Construction Room. One gets a better opinion of the size and scope of this fine effort.

Exhibition Room.—This room, which is 49 x 30 feet, is devoted to the exhibition of the products of the School. The room is conveniently located at the north-west corner of Floor B. Specimens of the students' work will always be on exhibition here, and those seen are a credit to the School

The Women Teachers' Common Room is worth a visit to note how well the staff has been catered for. These rooms are provided with suitable chairs and tables, and are used as private assembling rooms by the teachers.

Sewing and Dressmaking Rooms **will provide ample accommodation for girl students for some time to come. There are five large rooms set apart for sewing and dressmaking, all well equipped with modern trade appliances. The power machine room, 53 x 28 feet, is furnished with motor-driven machines, and the best trade practice is followed.**

THE TECHNICAL EDUCATION OF GIRLS.

The great aim in education is to equip the scholar for his or her future career. One of the surest means to this end, in a girl's education, is to teach her how to use a sewing machine and the best thing to do is to teach her in the operation of the machine she is sure to use in later life. Throughout the entire world there are more Singer Sewing Machines in daily use than all other makes combined. Therefore, it is important that girls should be taught to sew upon a "Singer" because it is the machine they will inevitably select.

For all household sewing the Singer Machine is pre-eminently the most serviceable. Whether for the finest embroidery, the plainest home sewing, or the most elaborate tailoring, the "Singer" is equally efficient.

A girl who has been properly trained in the use of a Singer Machine is not only able to save herself and family much money and time, but is equipped to earn her living should she require to do so, in one of the great sewing industries.

According to a recent census, 26,667 establishments, engaged in 59 distinct classes of manufactures in the United States and Canada, use more than 600,000 Sewing Machines, of which by far the greater number of Singers.

Education in the use of the Singer Sewing Machine, whether in the home or in the factory, is therefore absolutely essential in the technical training of girls, and the Singer Sewing Machine Co. offers special inducements and facilities for the promotion of such education.

The stitching plant installed in the Central Technical School at Toronto is a model of the highest standard for its purpose.

It comprises 25 power driven machines mounted on Singer sectional double-trough factory tables.

These machines are described as follows:

Twelve No. 61 W2 machines and eight No. 95-10 machines for stitching medium weight fabrics used in making ladies' wrappers, tea gowns, suits, skirts, lingerie, shirts, corsets, underwear, shirt waists, flanells, etc. These machines have a capacity of 3,500 stitches per minute, covering a wider range of work than any other lock-stitch machines of equal speed.

One (1) Machine No. 72 W19 for hemstitching on shirtwaists, neckties, underwear, etc.

One (1) Machine No. 71-30, for making straight buttonholes at a speed of 1,600 stitches per minute. These machines are specially designed for work in cotton and linen fabrics and knit goods; they excell all other machines for this purpose, not only in the quantity of work produced,but also in the neatness of the finish and the facility with which adjustments can be made. While truly automatic, they are simple and effective, not liable to get out of order, and are easily handled by operators.

One (1) Machine No. 68-7 for sewing flat buttons on shirts, shirtwaists, underwear, etc. Where small buttons are used these machines make a specified number of stitches for strongly attaching the button, always including three tying stitches; they stop automatically when the needle is at its highest point, and cut the threads off cloce to the under side of the fabric. The maximum speed of the machine is 1,000 stitches per minute, and a good operator can sew on over 7,000 buttons daily.

One (1) Machine No. 17 W12, for imitation of hand embroidery on waists, lingerie, costumes, lin[illegible] monograms, emblems, etc.

One (1) Machine No. 81-2 for overedging, knit and woven fabrics, leather, felt, etc. Machines of this class have a great variety of uses in the manufacture of underwear, lingerie, pocketbooks, jewelry bags, canvas gloves, and many other articles.

In addition to the machines above described, there are about 20 treadle Singer Sewing machines in other rooms.

The Demonstration Housekeeping Apartment will next command attention, and the thoroughness with which provision has been made to give the girls an opportunity of studying good housekeeping is very apparent here. A suite of rooms, including kitchen, pantry, dining room, toilet and bath room, linen and clothes closets, entrance hall and suitable furniture is provided. A special design linen closet, designed by Ross & Macdonald, consists of a series of trays behind glass doors.

The furniture for the Model Apartment was supplied by the Robert Simpson Company, and it will be noticed, utility rather than elegance was the keynote.

Lunch Rooms.—The two Lunch Rooms are one for boys and one for girls, with serving kitchen between. These rooms are furnished with chairs and tables, and will accommodate three hundred and fifty students at one time.

Domestic Science Kitchens.—There are four kitchens, about 40 x 30 feet, each equipped with tables, furnished with individual stoves and utensils, for twenty-four students. One of these kitchens has a double equipment, providing for either gas or electric cooking for each student. Adjacent to each kitchen is a supply room, with refrigeration.

The Demonstration Dining Room is well thought out, as the arrangement is to give the girls actual experience in waiting at table. It is a room 27 x 28 feet, and is reserved for class demonstration work in dining service. It is furnished with two dining tables, a sideboard, and a china cabinet. Furniture made by Elmira and supplied by Simpson's.

Lecture Rooms.—There are five Lecture Rooms, the one shown herewith has a seating capacity for 200, the others accommodating about 100. Each room is provided with a projection lantern and a science lecture table.

A *Lunch Room* is 70 x 28 feet, is well furnished, and here the majority of the students will take their meals. Furniture by Elmira through C. A. B. Jennings.

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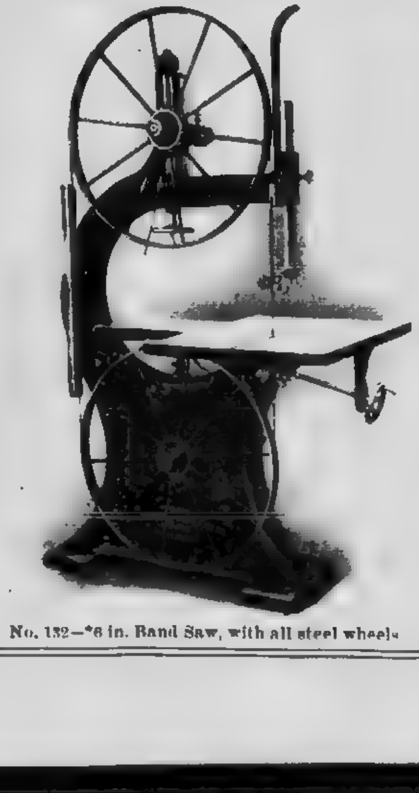

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The family size washer shown in illustration is sufficient for quite a large family; it is the product of the 1900 Washer Co., of Toronto, and forms the leading part of the Domestic Section of the School's Laundry. It will wash a tubful of clothes clean in six minutes; it is strongly made, easy and economical to run. It can be operated by hand where power is not available.

There appears to be nothing intricate or difficult about it, and there is practically no splashing over at all. It was selected in open competition for the School's Laundry

Laundry.—This room is equipped with machinery sufficient to handle the laundry work of the School as well as to provide instruction and demonstration in commercial and household laundry. The latter is illustrated, and shows a 1900 Washer outfit for the home.

Millinery Rooms.—Two rooms, one 37 x 28 feet, the other 49 x 28 feet, are reserved for practical work in millinery. They are furnished with work tables, chairs, cabinets and cases

Here ascent is made to D Floor, but before touring this floor a few steps are advisable to the Art Room, which has been set apart for figure and costume study. The sickly heat noticed usually in a room of this character has been entirely obviated by the great height given to the room and the perfection of the ventilation arrangements.

Electroplating Laboratory.— This Laboratory is provided with a motor generator to produce low-voltage currents suitable for electroplating, ammeters, voltmeters, tanks and other electroplating apparatus. Evidence of the trade's interest is shown here in the plant which they have so materially contributed.

Plaster Decoration Shops.— These shops are being fully equipped with modern tools, and will afford every facility for practical demonstration and work of the trades.
demonstration and work of the trades. Windows open to the south, giving facilities for sun exposure at any hour during the day school.

Laboratory for Elementary Chemistry. This room has working accommodation for sixty students, and locker accommodation for five hundred students.

Gas and electrical connections supplied by the A. R. Rice Co., of Toronto.

Laboratory for Industrial Chemistry—This laboratory is provided with three fume closets, and working tables and lockers for forty students, also special apparatus for various trades.

The Balance Room is for Chemical Analysis.

Gas and electrical connections supplied by the A. R. Rice Co., of Toronto.

Laboratory for Qualitative Chemistry (1). - This room is fitted up with special drafts, and a large fume closet for the hydrogen sulphide generator. There are working places for forty students

Laboratory for Qualitative Chemistry (1) — —This laboratory accommodates forty students and is provided with fume closets, D. C. and A.C. currents, compressed air, steam and drying ovens. Work executed by A. R. Rice Co.

Crafts; Casting Room; Clay Modeling; Art Class Room; Object Drawing; Drawing from Cast; Industrial Designing; Freehand Drawing.—For the purpose of giving a cumulative description covering the work of all rooms, a provision has been made for students to obtain a really good general education. It will be seen, the equipment includes for the making of Stained Glass; Wood Carving; Jewelry and Pottery, and the equipment for the casting of all forms of plaster work, and wareroom contains special design bins for holding pottery clay and modelling clay (supplied by Hendry). In the clay modeling room one finds all the necessary equipment for Modeling Artistics and Industrial features in statues and ornament. Another unique feature has been designed to eliminate the necessity for wetting the clay by wrapping in cloths. This apparatus is a galvanized iron structure arranged to hold any casts from the smallest miniature to life size models, and these are kept wet by mechanical means for any length of time. Dealing specially with Drawing from Cast, the room has a fine collection taken chiefly from antique statuary, but with several modern pieces to indicate the trend of present-day art. The storing of the casts when not in use by the students is well arrenged in a room at hand. Quite a good collection of Nature; Ornamental and Architectural casts are here. The placing of the students' drawing boards when not in use shows another modern idea.

The system for keeping clay moist for the Clay Modelling room. The clay is kept in large metal closets, fitted with shelves made from Plaster-of-Paris and Wood Chips on re-inforced expanded metal, upon which a continuous spray of water is directed.

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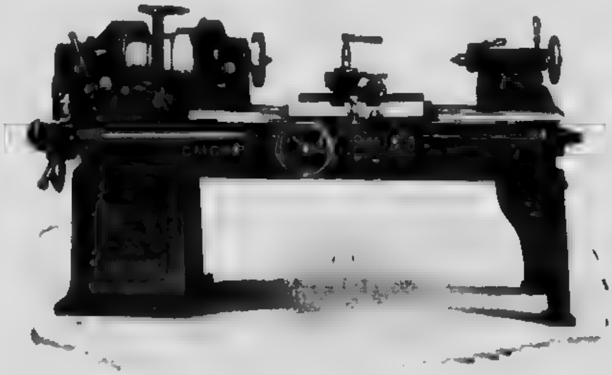

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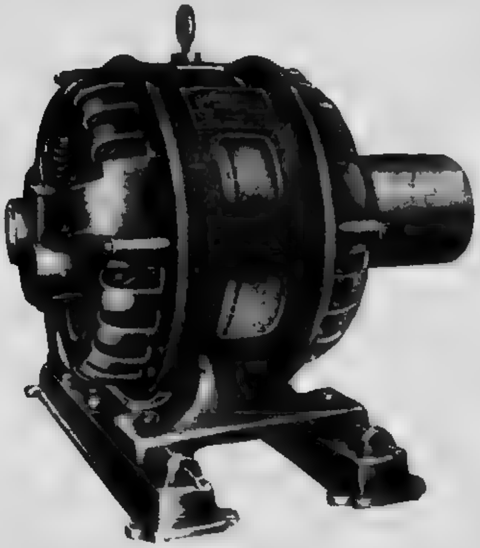

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The Art Room is furnished with dadoes of Red Cedar about ten feet high, upon which can be tacked specimens without damage to walls.

Clay Modelling and Casting Rooms.—These rooms are equipped to meet the demand of all students, whether engaged in trades or otherwise. Special damp cupboards are installed for preservation of models. Complete arrangements are made for casting and demonstrations.

Applied Art and Craft Rooms—This room will be devoted exclusively to craft-work, particularly in conjunction with industrial design. Special apparatus is installed for pottery making, stained glass work, metal work, wood carving.

Freehand Drawing Room.—This is equipped with special art tables for forty students. Special facilities are provided for blackboard drawing, two ends of the room being occupied with blackboards.

Object Drawing and Still Life Room.—The room devoted to object drawing is furnished with top and side lights, a large range of objects for students use, and five special still life stands.

Cast Drawing Room.—This room is equipped with a large assortment of modern and historic casts, special stands and easels, and demonstration blackboards. Top and side north lights are provided.

Industrial Design Room.—This room will be used as a general design room for day classes and for advanced classes at night, and is furnished with special tables and modern appliances for all forms of industrial design. The walls are covered with cedar wood for use in executing large works.

Drawing Boards, Tea Squares, Set Squares, Compasses and Sets supplied by the Art Metropole (branch in Toronto of the Hughes-Owen Co., of Montreal). This firm also supplies pencils, pens, rubbers, drawing and blueprint papers.

Electroplating Laboratory.— This laboratory is provided with a motor generator to produce low voltage currents suitable for electroplating, ammeters, voltmeters, tanks and other electroplating apparatus.

Metallurgical Laboratory.— The metallurgical Laboratory is furnished with various types of furnaces for use in assaying and the study of metallurgical operations.

Laboratory for Photography and Photo-engraving.—There is a large dark room with working space for twenty students, which is well ventilated by hoods over the sinks. It is provided with ruby lights and a smaller dark cabinet.

Roof.—The large number of 90 vent pipes and rain water connections on the roof give some idea of the tremendous amount of work involved under the head of plumbing. There are separate vents for toilets and Chemical Laboratories.

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The Bronze Electric Lighting Fixtures in the Entrance Hall, Auditorium, Library, Board Room and other principal rooms of the Central Technical School were supplied by

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The Science Rooms piping and Equipment are undoubtedly the most complete installation of the kind in Canada. Each fitting has been designed to give maximum strength and efficiency—this should result in the upkeep being merely nominal so far as these fittings are concerned.

The Vacuum Fan Machine for this school is unique, so far as Canada is concerned, in as much as it is capable of delivering 100 cubic feet of free air per minute, while maintaining a 12 inch vacuum.

The contractor for this special machine was A. R. Rice & Co., Toronto.

The Chemical Exhausts for the Laboratories here, as also in the Analytical, Physics, and Chemistry, are the work of A.R. Rice & Co.

The copper caps in the Laboratories are the work of W. E. Dillon Co., who carried out similar work throughout the building. In fact, W. E. Dillon Co., had a large amount of copper work to do, the greater part of which is hidden in the various ducts, nevertheless, their work has been executed to satisfaction.

Preston Wood-Working Co. supplied the School with 23 machines in all, driven in groups, for Manual Training Lathes, Sander, Rip Saws, Cut Off Saws, Buzz Planer, and Jointers. All these machines are motor driven. They have made a specialty of this style of drive.

Elementary Woodworking Shops. There are two elementary woodworking shops, each equipped with six lathes, a trimmer, a mortiser, a jointer, a power saw, a tool grinder, and twenty-four benches and the usual small tools.

Life Drawing Room.—The large square tower room is particularly suited for life drawing. Top and side lights and special curtain arrangements and adjustable throne for models are provided.

The paper used in this program is the product of the Provincial Paper Mills Co., Limited. It was made in Canada therefore. In a subsequent issue of "Training" some very interesting details will appear of the good work being done by the Directors of this company in regard to Technical Education in conjunction with McGill University, and the Forest Products Laboratories. The ink used for printing this program is of Ault and Wiborg make.

The G. M. Hendry Co.'s contract included Chemical Supplies, Photographic Reproductions, Casts, Statues, etc., Pottery Equipment, Physical Apparatus, Balopticans, Furniture.

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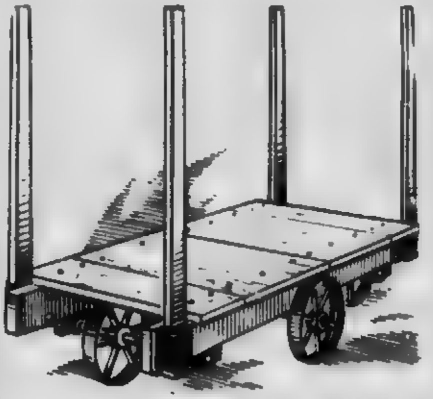

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THIS DESCRIPTIVE ACCOUNT OF THE

TORONTO CENTRAL TECHNICAL SCHOOL

is published under the auspices of the

Ontario Association for the Promotion of Technical Education

an Association fortunate in having as its Councillors Representatives of the Boards of Education, Boards of Trade, Canadian Manufacturers' Association, Trades and Labor Council, Women's Councils and Institutes, Architects' Association, Clay Workers' Association, Arts, Crafts, Home Industries, etc. who devote time and energy to pushing the GREAT NEED OF CANADA TO-DAY:—TECHNICAL EDUCATION IN ALL ITS PHASES.

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Mrs. Dr. Adam Shortt, Vice-President for Ontario National Council of Women, Ottawa.

Its official organ, "TRAINING," a monthly magazine of which this program forms part of a special issue) is controlled by the following provisional directors of Training Co., Limited.

Dr. James L. Hughes, formerly Chief Inspector of Schools, Toronto.

Dr. Horace L. Brittain, Director of Toronto Bureau of Municipal Research.

E. A. Hardy, B. A., D. Paed, Jarvis Street Collegiate Institute.

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Thos. Bengough, C.S.R., Chief Reporter Senate of Canada, formerly Secretary Royal Commission on Industrial Training, of 107 Gloucester St., Toronto, Secretary.

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To the courtesy of the Architects, Engineers, Contractors, and their staffs, and others identified with the School, the publishers thanks are tendered for material assistance rendered.

AUTUMN CONVENTION

OF THE

Ontario Association for the Promotion of Technical Education, at Toronto Technical School, Sept. 1, 1915

(Opening at 9 a.m.)

DRAFT PROGRAM

1. Opening Remarks—President Fairbairn.
2. Address of Welcome—The Hon. the Minister of Education for Ontario.
3. Review of Association's Work—Secretary Bengough.
4. Survey of Present Position of Technical Education in Ontario—Dr. Merchant Provincial Director of Technical Education.
5. Discussion and Open Conference, with suggestions for coming year's work.
6. Address—"The Human Element in Technical Education," Miss E. J. Guest, M. A., representative of Ontario Women's Institutes on Council of Ontario Association.

NOTE—Delegates are invited to attend afternoon Conference and to join in inspection of Technical School.

DOMINION CONFERENCE

(Opening at 2 p.m.)

Introductory remarks by Rhys D. Fairbairn, Esq., President Ontario Association for Promotion of Technical Education.

1. Address of Welcome, by a representative of the Government.
2. Reports from the several Provinces by Official Delegates.
3. Discussion of Forward Dominion Policy regarding Technical Education and Federal Grants.
4. Inspection of Toronto's magnificent New Technical School (the last word in technical building and equipment) under the guidance of Dr. McKay, Principal.
5. (Evening) Visit to Canadian National Exhibition as guests of the C. N. E. Association.

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AN EMPHATIC REPLY

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The Point of Departure Between Osteopathy and Medicine

By Dr. Herbert J. Pocock, Past President of the Toronto Association of Osteopathic Physicians,
C.P.R. Building, Cor. King and Yonge Sts., Toronto.

In an open hearing before a committee of the Provincial Legislature of Ontario, a question was asked by one of the members of the committee that went unanswered.

"What," said he, "is the point of departure between Osteopathy and medicine?"

If we are right in believing that all who think at all about Osteopathy ask themselves consciously or unconsciously the same question, then the answer will be pertinent here.

The most conspicuous point of departure is that the doctor of medicine gives medicine; the osteopathic physician does not,but instead corrects structural disorders, which the medical doctor does not, and leaves the rest to nature. Many things they have in common, that is, they both correct bad habits, advise diet, use surgery occasionally, etc.

In his mind the average man asks why this is a point of departure, Are the two schools compatible?

They are incompatible. And they are incompatible practically, psychologically, historically, educationally, scientifically and philosophically.

PRACTICAL POINT OF DEPARTURE.

The osteopathic physician corrects disorders because he finds them. No other reason need be given. And he leaves the rest to nature because he finds that is all that is necessary. A purely practical thing is the practice of Osteopathy. The practice of medicine, on the other hand, uses medicines because it "believes" in them, and because the authority of its school teaches them; that is to say, because such is the traditional practice of that profession. It is not because medicines have been found efficient. What the medical world really has found out about medicines is—that it has to keep on changing them, and hunting for new ones.

PSYCHOLOGICAL.

Is the use of the word "belief" here justifiable? I think it is, and incidentally it brings us to the psychological point of departure. "Belief" in drugs is buried centuries deep in the mind of the whole people. When some man becomes a doctor of medicine he carries this belief with him. It takes years of practical experience to shake it. As fast as the belief is destroyed at the top it is renewed again at the bottom.

Also one believes in what one does. The belief in drugs is a natural consequence, as well as the cause, of giving them.

No fault is to be found with the medical profession for this. The medical profession is merely that part of the great public which devotes itself to the care and the cure of disease along traditional lines. The fault, if it is a fault at all, is to be attributed to human nature, mystery loving, miracle-loving, conservative—living nine-tenths in the shadows it has itself made.

HISTORICAL.

The historical point of departure dated from the very beginning of Osteopathy. It was rejected by the medical profession. Dr. Still proclaimed his new discoveries to his brother practitioners of medicine of that time and place, and has continued to present them ever since. They were and are rejected as being impossible and absurd; which means that they are incompatible with the training of the medical mind and with the practice of the medical school.

Compelled thus to grow up outside the medical school, the new practice nevertheless continued to develop until it became both a separate profession and a separate science. It cured and continued to cure those who came to it, many of whom thereupon became practitioners, practitioners on whom medicine and surgery had failed—and these helped to emphasize the difference between medicine and Osteopathy.

The strongest point in the historical departure was this, that Osteopathy had an opportunity at first with only those on whom medicine had failed; whereas medicine handled all cases as they came, of whom at least eighty-five per cent, recover anyway, with or without medicine, for which nevertheless medicine gets the credit. Thus only in the case of Osteopathy was there a fair test of value. This test was immensely favorable to the new system.

Its success, however, did not bring about the glad acclaim of the medical practitioners. Instead it hardened their hearts. Nor is this to be charged against them as a bad mark. It is not medical, it is human.

We are not under the necessity of apologizing for human nature. but it marks a point of departure between Osteopathy and medicine.

EDUCATIONAL.

In its growth, therefore, Osteopathy followed the lines of least resistance and grew up a separate system: though it is a matter of fact that another medical practitioner, from Edinburgh, a Fellow of the Royal Society of Edinburgh,was farseeing enough to put the pressure of his undoubtedly great genius behind the anti-medical tendencies, to establish the independence of Osteopathy as firmly as he could. This man was Wm. Smith, M.D., F.R.C.S, D.O.— of which titles he valued the last the most.

Far from being a disaster, this absolute division proved to be the finest thing possible for the new science. If, by new methods, the old ones could be shown unnecessary, then was the world so much the gainer; for the old ones were at all times dangerous, and, with the least incompetence, deadlier than the disease.

Thus the educational departure of the new system became absolute. This enabled the new system to carry its measures to the highest possible efficiency.

SCIENTIFIC.

As to the scientific point of departure, a scientific criticism of Osteopathy by the medical profession was never made. This was at first galling to many members of the osteopathic profession, but it need not have been. The last possible thing that a crowd, or any mass of men, or even a profession, is capable of, is scientific thinking. Science is an individual matter. With the mass of men, taken as a whole, it is an art. And one art is typically jealous of the other arts. This the public does not see, of course, and it seems that the legal mind does not see it any more easily; for it has tried persistently to compel the two to mix.

But the science of Osteopathy also has its exclusiveness; and in spite of the excellence of many scientific minds in the medical profession, it is impossible for the science of Osteopathy to lessen the rigidity of its scientific exclusiveness. First, the medical profession practically rejected the science of Osteopathy. Then finding itself isolated and defined, the osteopathic profession found also that it had in hand a science that would not mix with medicine. This is in no sense a personal or a professional matter—it is a question of science. The osteopathic profession found its science positive findings with the positive pathology of general science, and with its own therapeutic measures. It found that it could not harmonize the definite and positive facts and principles of its science with the guess work of the medical practice. Osteopathy was positive and exceedingly helpful. Where its helpfulness failed and its logic would not reach, there it was admissible to have recourse to experiment again, as the world had always done—had always had to do. But in so far as there was a definite and positive thing, experimental practice was simply shoved farther away from the problem of disease.

So long as the medical profession held the medical system to be fundamental, to be curative and not merely experimental, to be positive and not merely palliative, and an emergency system, so long was no compromise possible. This is, of course, a matter between the professions, not between the sciences. Science is impersonal and cannot take sides. It is a matter for proof, not for warfare; science cannot disagree with science. Scientists may dispute with scientists, however, and will till the end of time.

In practice, as all the world knows, from the beginning up to the present time,the majority of the profession has acted upon this principle; it has claimed exclusive rights in therapeutics and in authority. It has again and again shown an inability to develop self-criticism. This is not the fault of the men but of the system, or perhaps one might say, of human nature. The whole spirit of the miracle-seeking is opposed to pure science or any science. Mystery and miracle go hand in hand.

But granting this fault in the philosophy and in the practice of medicine, is there yet no basis on which any of the great mass of work done by medical men can be made available—can be found compatible with the osteopathic science? The omission of materia medica from osteopathic schools does not mean the omission of surgical and sanitary medicines, nor is it to be understood as meaning necessarily a denial of any truth or value in materia medica. Science cannot take sides or negative attitudes. It is, however, a very positive assertion of the superior value of osteopathic means and of the greater need of developing those means.

The contrast must be made between the traditional practice of medicine and the wonderfully valuable research work being done in the laboratories. Of this latter it is impossible to speak in terms of too high praise. The devotion and ability there has brought to this age a degree of progress which must, when true perspective is obtained, stamp it as the great therapeutic age. The research that is of value, however, is that in physiology, biology, bio-chemistry and surgery, Sanitation is a department of surgery, as are the wonderful agencies for the deadening of pain. In all of this Osteopathy rejoices and profits.

PHILOSOPHICAL.

The philosophical point of departure is no less definite and absolute.

In medicines and other systems we have experimental methods for curing diseases. Whether it be drugs or electricity or hydrotherapy or psychotherapy or any form of therapy, they are all attempts to make a wide or universal application of a thing that proved good in some cases. They are entirely experimental methods, merely trying for further results with litle reference to causes, processes, and laws which are almost entirely unknown.

They prove themselves mere methods, because they adopt other experimental methods and find no incompatibility in doing so.

PHILOSOPHICAL is here used in its commonly accepted meaning as pertaining to the knowledge of the causes of all phenomena both of mind and matter, rather than in its strictly technical sense.

They prove themselves experimental methods in the very criticism their exponents make of Osteopathy, being unable to see in it anything but another mere method.

In contrast to these experimental methods stands the osteopathic practice, based on the actual facts discovered in the individual case, agreeing with biology and explaining pathology: moving not at all until it finds disorder, and then only moving to correct this disorder, and not allowing itself to be drawn into mere guess-work, prefering rather to leave all to the understanding of Nature, except in so far as it can remove the causes of disease.

These two contrasting systems cannot live together in the same mind. Those schooled in experimental methods who have sufficiently considered the osteopathic doctrines are convinced by them, and become osteopathic physicians and cease to be "believers" in anything else; but rise to the higher scientific plane of working with the facts and trusting in them.

Osteopathic philosophy is based absolutely on this principle. It considers no move justifiable until that move can be based upon knowledge. It considers it rarely justifiable to interfere with or to suspect Nature's processes, for which she has reason, or to nullify her laws, which are the conditions under which she moves. The worst possible travesty of science, the most pessimistic, indeed the most atheistic and chaotic attitude toward Nature, is that which justifies blind experiment in an ordered physiological being. No justification can be found for experimental methods, except in the absolute lack of sufficient knowledge of cause and effect, and then only because the public demands that some effort be made to cure or to discover a cure for their diseases.

The philosophy of the medical system, if it can be said to have a philosophy, seems to have been based upon the doctrine that everything made by the Creator was made for some purpose.

Possibly most of us would agree with this, but when the medical profession goes on to assume that He put ready to our hands all the herbs of the field and all the chemical and other forces of nature, therefore He meant for these to be used for our relief in disease,we most heartily disagree. The logical fault of such a .doctrine *is that it has no virtue.* As well say, twice two is a pot of beans. It has been broad enough, however, to justify almost any conceivable vagary that any dreamer with the medical degree could devise.

This philosophy can hardly be called a philosophy. It is merely an inheritance. What the facts really are is as follows:—In so far as it is a mystery the only way to reach it is through experiments. The public demand that some effort be made, and it loves miracles. The search for specific remedies is the search for a miracle. Mystery and miracle go hand in hand. This miracle idea is a lineal descendant of the Philosophers' Stone with which students of history are familiar, the parent of alchemy and through alchemy the parent of history are familiar, the parent of medicine. The survival is not a science but a psychological phenomenon; not a fault of any group of men but an expression of human nature.

In contrast with this, the philosophy of Osteopathy asserts that since the majority of mankind remain healthy, under given conditions, and one or two become sick under these conditions, therefore the power exists in the organism to remain healthy, and the reason why illness arises in some cases and not in others is to be sought for, in some difference in those individuals. That difference is hunted for and found; and on it is built the practice of Osteopathy. Nature does not create functions to exist only as diseases. When disease does arise, it presents a question for determining what are the compelling causes. These compelling causes are found by Dr. Andrew Taylor Still to consist of actual disorders in the parts of the body. As such they were studied. Thus developed the Science of Osteopathy.

The philosophy of Osteopathy is the philosophy of fact. The osteopathic profession makes a positive diagnosis of actual disorders. It shows in terms of known philosophy the relation between the disorders and the result. In most cases it presents records (made by men capable of making such records), of benefit or of cure, from the removal of these causes.

The great point of departure, then,between Osteopathy and medicine is that between a practical fact and experimental practice.

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Many photographs intended for this program could not be included, as the rooms or shops were not in readiness for taking at time of going to press.

Mathematical instruments for the Laboratory were supplied by the Art Metropole, the Toronto branch of the Hughes-Owen Co., Ltd., of Montreal.

The Art Metropole supplied most of the Mathematical Instruments for the School. The Art Metropole is the Toronto branch of the Hughes-Owen Co., of Montreal. They also supplied water closets and the Blackboard machines.

The motor generator supplied by the Swedish General Electric, Limited, is of special design and arranged particularly for laboratory and testing purposes. The set consists of one 25 KVA. 125 volt, 3 phase, 60 cycle, revolving field alternating current generator, designed and arranged so that single phase, two phase or three phase current may be obtained, by a simple interchange of connections on the generator terminal board. A special field rheostat of wide range is also supplied in order that a suitable range of operating voltage can be had for testing or experimental purposes. The generator operates at 1200 RPM and is driven by a 35 BHP shunt wound, interpole, direct current motor, so arranged that by shunt field control, a speed varying from 1100 to 1300 RPM can be obtained. Both machines are mounted on a substantial cast iron bed plate, making the motor generator set a self contained unit. With the motor generator set, is also supplied the necessary rheostats and automatic switches. This set (very similar to several others that have been supplied to Technical Institutions and Universities throughout the Dominion) it will be noted that has some features in connection with the design of the alternating current generator that are interesting from a technical point of view.

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Thomas Bengough, C. S. R., Editor, 107 Gloucester Street, Toronto, Ontario, Canada

VOL. I., NO. 7-8 TORONTO, JULY-AUGUST, 1915 $1.00 A YEAR

Our Special Number.

This issue of TRAINING forms a fitting souvenir of a constellation of events —(1) the auspicious opening of Toronto's great new Technical School; (2) the holding of the second Autumn Convention of the Ontario Association for Promoting Technical Education, and (3) the gathering of official representatives from several Canadian provinces to discuss Technical Education from a National standpoint.

The production of this souvenir number of a magazine not a year old has been made possible by the co-operation of three separate bodies of persons interested in our movement: (1) the recently organized Training Company, Limited; (2) the Ontario Association mentioned, and (3) the advertisers who have taken advantage of our columns.

We believe this issue of TRAINING and the meetings it is commemorating, herald greater things for Technical Education in Canada.

The Dominion Conference.

In the midst of war-time it might seem too bold to suggest a meeting of representatives from Canadian Provinces stretching over three thousand miles to discuss problems which must wait for solution until the war is over.

Yet present prospects are encouraging as to the number and calibre of the representatives who will foregather in Toronto on September 1st, and we are looking for a really profitable Conference, the program of which is to be found elsewhere in this number.

Returns to August 10th show that official Government representatives will be present from Alberta, Saskatchewan, Prince Edward Island and Nova Scotia.

September Meeting of the Ontario Association.

The Ontario Association for the Promotion of Technical Education will have the unique honor of being the first outside organization to meet in the magnificent new Toronto Technical School. This is quite appropriate, in view of the pleasant relations existing between Association and School.

Mr. Rhys D. Fairbairn, as President of the Ontario Association, and also Chairman of the Advisory Industrial Committee which manages the School on behalf of the Toronto Board of Education, is the vitalizing connecting link between these two institutions whose work and aims are so closely identified.

It is hoped and expected that the Convention of the Ontario Association on September 1st will be well attended, interesting, helpful, and enthusiastic. The gathering last year, while comparatively small in numbers on account of the paralyzing effect of the declaration of war, was most optimistic in tone, and the addresses were strong and stirring pronouncements, which caused much commendatory comment when published in the January, February and March issues of TRAINING.

The Survey of the Present Position of Technical Education in Ontario, by Dr. Merchant, the Government Director of Technical Education for this Province, will have unique value, for no man except Dr. Merchant could give such a review, and his address will contain matter which does not appear in any official report. Moreover, the questions asked Dr. Merchant by delegates, and the discussion following his address, will uncover material of great interest and value in itself, as well as give helpful interpretation to official reports and regulations. Thus it is hoped the representatives of the schools and classes throughout Ontario, in which handwork of various grades is being done, will receive information and inspiration which will prove helpful to progress along the entire line of development.

Miss Emily J. Guest, M.A., who delighted her auditors last year, will be heard again—this time with special pleasure, for she will deal with a subject in which she takes intense interest. The title of her address, "The Human Element in Technical Education," is not fully expressive of the scope of her ideas; but it suggests a world of thought which Miss Guest can be trusted to put into language both pungent and poetic. No woman could interpret more clearly the sentiments of the 25,000 rural home-makers of Ontario as represented in the Women's Institutes which permeate and vitalize the life of this Province. Ontario is to be congratulated upon having its rural women so efficiently organized; and we can promise a rich treat to all who hear Miss Guest's address.

While the above are the chief set addresses, other features of the Convention will prove to be equally interesting to many delegates.

The Opening Remarks of President Fairbairn always put the auditors at their ease, and suggest many lines of thought and endeavor.

The Welcome from Ontario's Minister of Education will be a hearty expression, in words, of good-will which is being daily exemplified in deeds by the Minister and his official deputies.

The Review of the Association's Work by the Secretary will be brief but very encouraging to all persons interested in the advancement of technical education in any phase.

While the session of the Ontario Association's meeting will occupy only the forenoon, so as to leave opportunity for the Dominion Conference in the afternoon, it is to be noted that delegates to the morning meeting are invited to attend the Dominion Conference and also take advantage of the "personally conducted tour" through the magnificent Technical School under the guidance of Dr. McKay, its principal. The running comment of Dr. McKay, in explanation of the philosophy and plan of the School, will be one of the chief items of interest on the program.

Alberta's Summer School for Teachers.

The policy of the Alberta Department of Education regarding the development of instruction in the practical arts and in Science and Agriculture involves (a) financial aid to the local school boards in providing necessary equipment and facilities; (b) financial recognition for teachers who qualify and satisfactorily conduct work in their schools, and (c) provision of opportunities whereby teachers may extend their training so as to be able to do the additional work successfully, while conserving the best standards for the school work as a whole.

The Summer School for teachers, held under the Department's direction, at the University of Alberta, Edmonton, was in 1913 attended by 80 teachers, and in 1914 by 155. A special series of courses was organized for school inspectors, to enable them to co-operate with teachers in the development of the work.

We have received the announcement regarding the Summer School to be held July 5th to August 7th, from which it is evident the Department of Education is finding it an effective instrument for stimulation and supplementary training of teachers. Provision is made for 300 teachers, and over 20 specialists have been engaged for instruction purposes.

A series of courses, in each case involving two summers' work, is offered leading to a special elementary certificate in (a) Science, Agriculture, Gardening and Nature Study; (b) Household Arts, Household Science, Management and Art; (c) Art, Art Methods, Design, Drawing and Painting; (d) Manual Training, Paper and Cardboard Work, Textile and Basket Work, Clay Modelling and Penmanship; (e) Woodwork, Shop-work, Design and Mechanical Drawing; (f) Physical Training, Strathcona Drill, Organized Play, Musical Games and Folk Dancing.

This year, for the first time, a special series of courses was offered teachers responsible for Science and Agriculture in High Schools. While a number of such teachers are Science specialists, the great majority in towns and villages did not specialize in Science or Agriculture at College, and are at a disadvantage in approaching these subjects, especially from the practical side.

The Kindergarten as a Basis for Technical Education.

By James L. Hughes, LL.D.

The men and women of Canada should receive a thorough training in technical education because Canada possesses more natural resources than any other country. These resources should be manufactured in Canada, in order to produce the largest possible amount of national wealth.

National wealth is not effectively used if it is sold to other countries to be manufactured. Raw material of little value may be made very valuable by artistic manufacture. The clay in a vase costing ten dollars may be worth but five cents. The artistic workmen and women who transformed the lump of clay worth five cents into an exquisite vase worth ten dollars, added nine dollars and ninety-five cents to the wealth of their country.

Canada should retain the nine dollars and ninety-five cents. How can she do it? By keeping her raw material at home, and by training a race of original, artistic, skillful, and intelligent men and women.

THE ELEMENTS OF POWER.

One of the most unaccountable errors of popular thought in regard to education is that technical education is something to be added to the training of young men and women after they have finished their course in the public schools. This is a serious mistake. The real elements of power in technical education, as indeed in every other department of educational power, should be started to grow in the kindergarten, if they are to develop into full strength and beauty. The elements of every form of power are in the children naturally. They cannot be put into the children by any system of teaching. The highest work of all schooling is to develop the natural powers of each child and keep them growing so that they may become the greatest central, productive, achieving elements in skill and character.

The kindergarten philosophy is the only educational philosophy that aims to do this; and the kindergarten is the only system of education that uses a carefully and logically-related series of operative processes to achieve this most desired end.

The kindergarten must be the universal basis of education, if education is to become a productively constructive and transforming element in the life of a nation.

KINDLING THE POWER CENTRE.

1. The kindergarten kindles each child at the center of his special power. This is the most important foundation for the development of each child, as an individual, and as a true unit in the social life of his country. All modern progress in education has been based on an increasing reverence for the value of the individuality of selfhood of each child. No man can ever do his best work unless his sphere of life calls into operation the elements of his special power. The child's individual power cannot be revealed to him by words or by study. It can be revealed only by operative processes which are performed by himself, and guided by his own self-activity. He must not only be a transforming agent, he must transform in the achievement of his own plans. The kindergarten is the only educative process that attempts to attain this result, and it succeeds.

MAKING THE CHILD ORIGINAL.

2. The kindergarten makes the child original. Every day the child makes out of material things something original; something that he has not been shown by some one and told to copy. His work is creative, not merely productive. Laws for his guidance are made clear to him not by words but by illustrative processes, and when he understands a new law he relates it to other guiding principles applied before, and evolves a new plan of his own which he at once works out in appropriate materials. From his first day he makes original plans under guiding laws. Twenty children in the same class, applying the same law, will often produce twenty distinct results, each one typical of the individual who produced it. Originality is a

vital element in technical work in increasing value in manufactured articles.

DEVELOPING CONSTRUCTIVE FACULTY.

3. The kindergarten develops the constructive tendency in each child. It makes him happy in producing things in harmony with law. Every child is happy when he is transforming materials into new forms. This transforming tendency and its accompanying happiness increases in power and in delight, if supplied with materials appropriate to the stage of the child's development, and guided by simple and naturally-evolving laws. The kindergarten supplies the suitable material and the directing laws.

BASIS FOR INDUSTRIAL ART.

4. The kindergarten lays the broadest and deepest basis for industrial art. Art is not revealed for art's sake merely. The kindergarten art is applied art. The every day work of the child is the application of the principles of construction in association with the principles of art, forms of beauty and harmonious colors, in producing articles of new designs, each child making his own designs, both of form and of artistic value. The kindergarten is the only educational foundation for a life growth in the consciousness of the unity that should exist between beauty and utility. It is futile to introduce technical schools in cities or towns, as a completing course, unless in the kindergartens and the succeeding classes the fundamental principles of industrial art have been not only taught but applied. In this way only do they become vital elements in the constructively productive character of men and women. To send young people to the university without previous training in mathematics and literature would be no more unwise than to hope for a reasonable degree of success from the establishment of technical schools in cities that have not a good system of industrial art in the elementary schools, based on the applied art of the kindergarten.

The country that possesses the largest natural resources should in time become the wealthiest nation, if it has a universal system of technical training based on the kindergarten, and continued through all the succeeding grades, that will produce a people with productively constructive tendencies who are original, not merely imitative, and who have learned industrial art by applying it, so that it has become a conscious element in their lives, which with increasing power decides their ideals of harmony and of beauty in manufactured articles.

Vocational Guidance.

As a Reliable Aid to Efficiency and Avoidance of "Dead Ends."

Vocational guidance and vocational training are not the same. Vocational training consists in special courses of study and work in schools to qualify students for certain departments of life work. Vocational guidance consists in giving expert advice to young people when they are seeking employment by men and women who are best qualified to do so.

A great many young men get started wrong in life and merely drift into some line of work by chance. WHY? Because they have lacked proper advice in choosing a vocation. We guide our boys and girls to some extent through school, then drop them into this complex world to sink or swim, as the case may be. Yet there is no part of life where the need of guidance is more emphatic than in the transition from school to work.

The aim of the Vocational Department is to point out practical steps that can be taken to remedy these conditions through expert counsel given by men prominent in business and professional life.

What man is there among us who would not be glad to help put the other man's boy on the right track?—This is real citizenship.

BUSINESS AND PROFESSIONAL MEN ASSIST.

Probably the local agency best fitted to conduct an employment and advice bureau is the Y.M.C.A. In Toronto the Central Y.M.C.A. conducts such a bureau, the following gentlemen forming the Executive Committee of the department:

Chairman, Dr. Jas. L. Hughes.
W. P. Gundy, President Board of Trade
Dr. Fred J. Conboy, Board of Education.
James Simpson, Secretary and Manager Labor Temple Co., Ltd.
John A. Torle, Supervisor Sun Life Insurance Co.
Dr. A. H. Abbott, University of Toronto.
G. A. Warburton, General Secretary Y. M. C. A.
J. P. Hagerman, Boys' Secretary Y. M. C. A.
Department Secretary, E. F. Trimble.

More than a hundred of the leading business and professional men of Toronto give their time to meeting boys and young men to give them counsel in regard to the calling they have chosen.

Individual counsel may be received by interview with a member of the particular profession in which the boy is interested by getting an introduction from the Department Secretary. The counsellor reports to the Department on a regular form.

QUESTIONS PUT TO THE BOY.

Every boy making application for guidance is asked to answer 48 questions in writing. Before answering them he is asked to read carefully the following:

Choosing an occupation is a much higher problem than "hunting a job." It is one of the grave questions which every young man must face. But the fact is that many are forced to select an occupation before they have the opportunity of really knowing their own ability and natural inclinations.

The choice of an occupation should be based on intelligent consideration of certain principles and facts. A few of these are:

1. Great success in any line of work usually comes only to the man who finds delight in his work.

2. Large salaries are only paid for high quality or large quantity of work. But a misfit man can only measure up to the high salary standard of quality or quantity by long years of forced adjustment. This does not produce happiness or contentment. Service is the basis of success.

3. Select the vocation in which your ability will produce the most for your fellow men as well as yourself. No lower motive will really satisfy you in the long run of years.

4. Your decided inclinations, your likes and dislikes, are to be considered. Ask yourself "What would I really like to do? Why?"

5. Make a careful, thorough, honest analysis of yourself, under guidance. Putting it down on paper seems a simple matter, but it is of great importance. Take pains to fill out the self-analysis blank, and you will gain a distinct benefit.

6. Investigate as many occupations as you can. Note the advantages and disadvantages of each. Find out the kind of ability and training demanded for success in each. Try working during vacations or in off hours at various lines of employment. Get at the facts, do not allow sentiment to over-rule your judgment.

7. All natural forces follow the line of least resistance. Avoid the over-crowded occupations if your talents can be equally applied elsewhere. At the same time be careful to avoid the "easy job" which may lead you into a rut and bury you there.

8. When offered a choice of positions, take the one which will do most to develop your initiative, give you the greatest independence and greatest permanency, without regard to pay.

9. On these last three points, be sure to consult the Employment Secretary and the Business Men Counsellors.

10. Remember you have a place in the world's work.

By studying the boy's answers and the reports from his school, and from the expert who interviewed him, the department is able to give reliable advice.

One agency for arousing the interest of the young men of Toronto and leading them to study their qualifications seriously has been found of great service. Lectures were given last winter to nearly all the High School Boys of the city in the Y. M. C. A. buildings by prominent lawyers, doctors, ministers, educators, engineers and business men, explaining the qualifications essential to secure success in the different departments of business, and in the various professions.

One thing the Y. M. C. A. through its vocational counsellors *does not* propose to do, is to select vocations for boys. None but the enquirer himself can and should do this.

ORGANIZE FOR NATIONAL EFFICIENCY.

When the war is over Canadians should organize all the assets of our great country to secure the highest economic efficiency. The most important element in every department of progress and of efficiency is the human element. It is a pity to give a boy a good education and then let him drift by chance into his life work.

The work of the Toronto Y. M. C. A. in professional guidance should be done in the associations throughout the Dominion. Similar work should be done for the girls of our country.

Vocational-Educational Surveys.

A Branch of Educational Engineering which is "Here to Stay."

By DR. HORACE L. BRITTAIN, Director of Bureau of Municipal Research, Toronto

Before building a bridge, a highway, a railway, or a house, some sort of preliminary study of the site, materials available and methods of construction has always been considered necessary. In deciding where to locate a store or a factory, the method of trial and error is no longer tolerated. Careful studies accurately determine the best site. In prescribing for a sick human body, some sort of diagnosis has always been considered a sine qua non. Even in laying out a course of physical education for the well human being, careful authorities make careful studies of the person to be benefitted.

But when it comes to ministering to the living needs of the youth of a city, the idea that an adequate plan cannot be drawn up in the arm chair of some professional schoolmen or around the table of some board of Education is only beginning to filter into the minds of the most intelligent people. While all agree that an accurate knowledge of the "fact" basis is necessary for all other sorts of construction,few see that the "opinions" of experienced men do not supply a sufficient basis for the expenditure of large sums of the people's money.

Nevertheless "educational engineering" is with us and is here to stay and the "hit or miss," "rule of thumb," "unsupported expert opinion" methods of determining educational policy will soon seem like relics of the dark ages.

CASE IN POINT—RICHMOND AND CINCINNATI.

Recently the authorities of Richmond, Virginia, secured the services of the National Society for promoting Industrial Education to make an educational and industrial survey of the city *"to give the city a knowledge of the industrial and school facts and conditions which must be considered in developing a program of industrial education,"* and the best expert advice as to what Richmond should do and how she should do it, in order that, as one Richmond School official says, *"Richmond may not be working in the dark."* The survey which followed secured the co-operation of practically all public and semi-public organizations, and brought out a remarkable report in two sections, one containing the fact basis and the other the recommendations based on the fact. The result is that Richmond has embarked on a plan of industrial education which she knows to be suited to her individual needs, a plan which has eliminated many extravagent projects advanced by theorists and enthusiasts before the survey, a plan which has behind it all the cooperating forces of the community.

The result of this survey has gone far to fulfil the four chief aims of the organization responsible, viz:—

1. *"To prove the necessity of a knowledge of industrial and school conditions in making the program for industrial education in a community."*
2. *"To show the kind of facts about industry and about the schools which need to be gathered.*
3. *"To develop a proper method for studying the industries and the schools for purposes of industrial education."*
4. *"To secure the co-operation of national and local public and private agencies in the making of a type survey and to bring to bear upon the task the best expert service and advice that could be secured."*

Another example of what may be done through co-operative studies of educational and industrial needs is furnished by the great industrial city of Cincinnati. In the autumn of 1913 the Board of Education requested the Chamber of Commerce to conduct a vocational survey of the leading industries of the city *for the purpose of obtaining information on which to base an extension of the industrial education of the city.* The study began with the printing trade, and resulted in recommendations which will add greatly to the efficiency of printing trade instruction in the schools, and should eventually save large sums of money to the taxpayers.

SOLVING THE PROBLEM SCIENTIFICALLY.

The following extract from the report of an industrial conference well expresses the necessity of community co-operation in solving the need of the community problem of vocational education:

> It seems obvious to those who have been in the work that vocational education cannot be carried on by the school-master alone, nor by the manufacturer alone, nor by the trade unionist alone. It requires the union of all three.
>
> Vocational education has for its controlling purpose the preparation of young persons for useful employment. This means fitting them to meet the requirements of specific occupations. If the schools are to prepare people for the machine shop or the print shop or the clothing trade, or the textile mill, or the electric shop, or the counting room, there are three things we must know. We must know what to teach in order to fit the worker to meet the demands of his vocation, we must know how to teach it, we must know when to teach it.
>
> The co-operation of the educator and the practical man is necessary in dealing successfully with these three problems. The trade worker must furnish the practical information about the processes and requirements of his calling; but the trained educator must have a large part in the organization of this material into a progressive course of instruction by the school, even when the school is operated by private agencies.

The world is becoming so alive to the necessity of deep and broad vocational education that there is grave danger of undue haste in many communities. The temptation always is to adopt a system which works well in some other community, without regard to differences in the basal conditions. Such a procedure is just as foolish and disastrous as to buy a suit of clothes from another man's measure, to wear a pair of glasses originally made for a friend, or to take a prescription made out for a different patient. The results may not be so immediately and dramatically startling, but will be much more serious as affecting the vital interests of large numbers of human beings.

In the whole field of education, cultural and vocational, without a knowledge of the salient facts, a community is always at the mercy of the faddist or the enthusiast who may see clearly but who sees only a small arc of the horizon. Hence the numerous additions which have no vital relation to the educational organism. Hence the educational "warts" which disfigure and handicap most school systems on the continent.

Canada's National Stock-Taking.

Sir Robert Borden's Con ions on the Need of the Day.

One of the most progressive and far-reaching movements in the history of Canada, originating with Sir Robert Borden, Premier of the Dominion, received official sanction of His Royal Highness, the Governor General, on June 28.

It foreshadows a National Stock Taking, with a view to the development of greater National Efficiency, and covers many of the points advocated by TRAINING since its first issue. This development comes just at the right time, for the war has vitally stirred public sentiment in the direction of greater production, less waste, more efficiency, better industrial and technical training.

Technical Education is not specifically named in the Order-in-Council for the very good reason that Industrial Training and Technical Education was exhaustively studied and reported upon by the Royal Commission appointed by the Dominion Government in 1910. Their four-volume report, printed in English and French, covering over 2,700 pages, has been thoroughly distributed throughout Canada. As the war interfered with action on the Commission's report, it is probable that the material then collected may be used in conjunction with what Sir Robert's Commission may gather, as the basis for a comprehensive scheme for putting Canada's interests and institutions on a thoroughly efficient footing.

The personnel of the commission is not yet ready for announcement.

In order that readers of TRAINING may be thoroughly informed, and thus enabled to co-operate helpfully with the new Dominion Trade Commission, as it will be called, we give in full the Report to Council adopted by the Government:

SCOPE OF DOMINION TRADE COMMISSION.

The Committee of the Privy Council have had before them a report, dated June 26, 1915, from the Right Honorable the Prime Minister, stating that he has had under consideration the desirability of appointing a commission for the purpose of making careful and exhaustive inquiry into the matters hereinafter mentioned.

The Prime Minister observes that the need is everywhere recognized of stimulating greater production in Canada, and especially agricultural production, the immense importance of which has been emphasized by reason of conditions arising out of the war.

That in connection with opportunities for increased agricultural production it is necessary to bear in mind the importance of

(a) Improved methods of production with a view to a better return to the producer

(b) Assisting this purpose by proper instruction and demonstration;

(c) Increasing the acreage under production;

(d) Attracting immigration of a type which would aid in ensuring a large and agricultural population;

(e) Stimulating and encouraging co-operation among the producers; and,

(f) providing cold storage and abattoir facilities.

AGRICULTURAL PRODUCTION, DISTRIBUTION, CONVERSION.

The Prime Minister further observes that the agricultural production of Canada is of a highly diversified character, and is spread over a great territory comprising an enormous area of fertile land of which only a small percentage is at present tilled.

The conditions of soil, climate and situation are so varied as to emphasize the necessity of pursuing methods of cultivation and purposes of production, which are especially suited to any particular locality under consideration.

The great area of territory embraced within the Dominion creates unusual problems which affect:

(a) Distribution of products in our home markets and the trade thus created between the several provinces and their various communities.

(b) The transport of products to our national ports from which they shall eventually reach their destination abroad; and

(c) Their transport to the market of destination abroad

The Prime Minister states that so far as is compatible with conditions herein mentioned it is manifestly in the public interest that before export the product should be converted through manufacture in Canada into the form in which it is proposed to be consumed or used; thus encouraging and stimulating those industries subsidiary to agriculture which can be carried on successfully in the Dominion.

CO-OPERATION, IMMIGRATION, UNEMPLOYMENT.

Important questions as to the marketing of our food products, including consideration of the time at which and the methods by which this is accomplished, should receive careful attention. The value of co-operative efforts among the producers, and the importance of reducing the present great discrepancy between the price received by the producer and that paid by the consumer, should not be overlooked

It has been represented to the Government that large numbers of persons who before emigrating to Canada had been engaged in agricultural pursuits, have not settled upon the land in Canada, but have been attracted by the opportunities for obtaining high wages in cities and towns and in the construction of railways and other works. The opportunities for thus obtaining work have recently become considerably restricted and this result has brought about a greater degree of unemployment than usually prevails. It further appears that very large areas of land for which homesteaders have secured patents are not under cultivation, and it is considered that the causes which have led to these results are a proper subject for thorough inquiry.

COLONIZATION AFTER THE WAR.

In connection with the subjects above alluded to, consideration should be given to the conditions which will arise upon the conclusion of the present war and to the resulting opportunities for a vigorous and effective policy of immigration which should have as its object the purpose of attracting to our shores immigration of a suitable type, and of inducing the settlement of an agricultural population upon the fertile uncultivated lands which are abundant both in Western and in Eastern Canada. In this connection inquiry should be made as to the means by which and the lines upon which the Federal Government, whether upon its own sole initiative or in co-operation with Provincial Governments, can best carry out an effective scheme of colonization

The return to Canada, after the conclusion of the war, of the Canadian troops now gallantly fighting beyond the seas for our Empire, and the probable immigration into Canada of other British soldiers and of men from the allied armies, after peace shall have been established, should also engage the attention of the proposed Commission in order that every reasonable opportunity through the assistance and co-operation of the Federal and Provincial Governments may be afforded to those who may seek employment

TRANSPORTATION, IMPROVEMENT OF HIGHWAY.

The Prime Minister further observes that the question of transportation, whether by land or by water carriage, is for reasons above indicated closely connected with the problems under consideration. With this should be considered the advantages which would undoubtedly be derived from permanent improvement of highways which are in truth an important part of our transportation system.

The approaching completion of two additional transcontinental railways is a very important element in our transportation problem. It has been represented to the Government that their construction has considerably anticipated the present capacity of the Dominion to provide traffic for trunk lines; while on the other hand important portions of newly settled territory are without the facilities which would be afforded by branch lines incident to a more carefully considered system of railway development. The condition thus created invites the careful attention of the Commission.

SECURING CAPITAL—EXTENDING MARKETS

As Canada has been and will be for many years a borrowing country, requiring capital for extending and developing its agricultural and manufacturing industries, and as the securing of capital at reasonable rates of interest is essential for increased production and continued progress, this subject should also be taken into consideration. It is to be observed that no proposal which would deter capital from seeking investment in this country, or which would unfairly affect that alreday invested under established conditions, would in the final result assist Canadian producers in any branch of industry.

It seems reasonable that under the conditions which have developed during the past six months opportunities will arise for widening and extending our markets to advantage not only of Canada, but of the countries and communities with which trade may thus be created or extended. The steps already taken by the Government for that purpose should be brought to the attention of the Commission and their consideration invited.

The Prime Minister having taken into account the foregoing considerations, as well as the representations which have been made to the Government upon the various matters aforesaid, recommends that a commission be appointed forthwith to consider, inquire into and report upon the same and any kindred subjects which may seem to them directly connected therewith.

The Prime Minister further recommends that such Commission be appointed under the Provisions of Part 1 of the Inquiries Act Chapter 104 of the Revised Statutes of Canada, and that the Commission be authorized to employ such scientific and professional assistance as its members may determine.

That the duration of the Commission shall be during pleasure.

That the Commission may make interim reports, from time to time, as they shall determine.

Organizing Prince Edward Island.

Social Survey Conference at Charlottetown.

At the Social Survey Conference in Charlottetown, the capital of Prince Edward Island, "The Garden of the Gulf," Prof. J. A. Clark, Supt. of the Dominion Experimental Farm made a fine address on Industrial and Technical Education. He said in part:

The purpose of the survey is to take stock in our community. In the words of the railway crossing it says 'Stop! Look! Listen!' When we undertake any work that requires haste, the quickest method of procedure is to 'stop, look, listen,' then act with the snap that a drill sergeant requires when he orders 'slope arms.' I am going to speak on individual efficiency, when the individuals of our nation are each doing thoroughly the work they are best fitted for. The organization of those units will be a simple problem. Men who have studied how the average individual does his thinking, his planning, his work, find those who work in any community with 100 per cent. efficiency can almost be counted on the fingers of one hand, and that the average efficiency in our every day work is only 35 per cent. of what it might be.

HOW TO CURE SCARCITY.

We talk about help being scarce! Here is a way of increasing each person's work so that he is equal to more than two. Canada to-day has great opportunities, and needs trained men and trained women more than ever before. Canada has lost hundreds of the most capable and skillful workmen since the war broke out. Up to the present Canada has been largely indebted to England and Scotland for the technically trained men for our industries.

Individual efficiency is based on a thorough knowledge of one's work; for in proportion as you know the laws of nature of a subject you will be able to work at it easily, surely, rapidly, successfully, instead of wasting your money or your energies in mistaken schemes or irregular efforts.

Knowledge about how to do things is called vocational and industrial training. When that knowledge is difficult to obtain and about subjects that the average man thinks of as being associated more or less with mystery it is called technical education or training. Education is a business proposition and necessarily involves handwork and also training of the senses as well as of the mind.

THE IDEAL COUNTRY SCHOOL.

Dean Bailey describes the country school of the future thus:—

There certainly will come a day
As men become simple and wise,
When schools will put their books away
Till they train the hands and the eyes
Then the school from its heart will say
In love of the wind and the skies

I teach
The earth and soil to them that toil
The hill and the fen to common men
That live just here
The plants that grow, the winds that blow
The streams that run, in rain and sun,
Throughout the year
The shop and mart, the craft and art,
The men to be, the part they play
In humble sphere.
And then I lead thro' wood and mead,
By bench and rod out unto God,
With love and cheer,
I teach

IMPROVEMENT OF ISLAND CONDITIONS.

Before we start to build a bridge or lay drainage tile we make a thorough preliminary survey. In 1910 the Royal Commission on Industrial Training and Technical Education held an investigation here. On page 1752 of their report they say:

> "There is no organized Industrial Education on the Island' no Manual Training except in Charlottetown and Summerside and Hillsborough Consolidated School; no Domestic Science except in Prince of Wales College and the school at Hillsborough. There are no evening schools in the towns and no short winter courses in the schools for grown-up farm lads, except at Hillsborough Consolidated School for three months in the winter, which was very successful as far as it went."

The recent survey of the Island shows a great advance in Agricultural Education and Domestic Science training in the last five years. It is only necessary to mention the successful short courses in Agriculture and Domestic Science that have been held; the private Industrial Classes conducted by Mr. Andrew McNair and Keith Rogers in connection with the Y. M. C. A.; also the Automobile School. Many attended these classes and got much information that they wanted.

WHAT ARE "FRILLS AND FADS?"

Many people still think of the manual training and sewing classes in our schools as "fads and frills." They forget that these subjects are much older than the three R's. The first courses of study before history was recorded are eminently simple and practical, being determined entirely by the conditions of life.

No doubt the boy learned to fish and to hunt, to make spears or fishhooks; the girl learned to sew fig leaves or skins, and perhaps to dig in a garden. After fire was discovered the girl learned how to cook and to prepare food. The only subject taught at that time was manual training; all other subjects that have since been added are frills and fads.

The wonderful response by the boys and girls when opportunity was presented to secure vocational training, even in Short Courses, shows that the demand for industrial education in Prince Edward Island is much larger than people thought a few years ago. Everybody does want to be personally efficient.

The old apprenticeship has passed. It did much good in its time, but to-day boys can get a job without becoming apprentices. Thus we find some of the necessary trades in the country, such as blacksmithing, almost depleted of workmen. What is being done for the 100,000 boys and girls from 14 to 16 years of age who every year enter some trade in Canada?

WHAT CANADA IS DOING.

Ontario leads the Provinces in this work. In 1911 their Industrial Education Act was passed, and much training has already been given. They went ahead in the city of Toronto and built a $2,000,000 technical school. Principal A. C. McKay mentions that last year there was a total attendance in all classes of 3,822 students, 2,300 being adults. In Nova Scotia, in the Technical School at Halifax, notwithstanding the war conditions, the enrollment increased from 820 to 860 students. There are no less than 27 classes offered along the many lines of industrial work in this excellent institution. Quebec, Alberta, Saskatchewan and British Columbia have made a good start towards Industrial Education.

It is realized by those who have given the subject of Industrial and Technical Education careful thought that it is a national proposition in which the Provincial and Federal Governments must co-operate. The war has delayed the Dominion Government in taking action on the report of the Royal Commission on Industrial Training and Technical Education, whose recommendations urge the annual appropriation by the Dominion Parliament of $3,500,000 for each year, for a period of ten years, for various aspects of Industrial Training and Technical Education; this sum to be distributed among the various Provinces of Canada in proportion to population, and subject to certain suggested requirements and conditions.

It seems evident that just as soon as this war is over there will be a great wave of industrial advancement. The nations are striving to-day to get a share of the immense German trade that has been destroyed by our Navy. It is only by individual efficiency and organization that we can hope to get our share.

THE ONTARIO ASSOCIATION AND ITS WORK.

The Province of Ontario formed an Association for the promotion of Technical Education in April, 1914, representing Boards of Education, Boards of Trade, Canadian Manufacturers' Associations, Trades and Labor Councils and Institutes, Arts, Crafts, Home Industries, etc. Many of the ablest men of Ontario are among the Councillors. As stated in the Constitution:

> "The objects of this Association shall be to bring to public attention the importance of industrial education as a factor in the industrial and educational development of Ontario, to provide opportunities for the study and discussion of the various phases of this problem, and to make available the results of experience in the field of industrial education."

The plan of organization of this Association is unique. The Council is composed almost entirely of representatives of various provincial organizations and interests having relation to Technical Education, and now includes nearly 15 such 'allies' more or less concerned in promoting Technical Education. The Association thus forms a rallying center for the various forces which are pushing the interests of the work throughout the Province, and in turn sends inspiration along these several lines to workers in the allied organizations. The Association may be likened to the palm of the hand and the affiliated organizations to the fingers; or, to employ the more popular military phrase, the several organizations may be considered as allies which have united their forces for the promotion of common ends. It is well understood by all concerned that the Association is in thorough sympathy and seeks hearty co-operation with departments and officials of the Provincial Government without regard to political affiliations, and of course secretarian lines are not drawn in Technical Education. The Association's efforts are intended to supplement and make more effective, and not to supplant, those of governmental and municipal bodies and officials.

Some of the busiest men and women have generously volunteered as lecturers, and have conducted a vigorous campaign: (1) to inform and assist artisans and home makers; (2) to implant among the people the habit of thinking about scientific lines; (3) To arouse and mould public interest in favor of Technical Education.

IN TIME OF WAR PREPARE FOR PEACE.

The Secretary of their Association, Mr. Thos. Bengough, in writing me in regard to this matter, said:

> "It is of supreme importance that Canada, from ocean to ocean, should be at once well organized for technical education, with active Provincial Associations, local branches in all sections of each Province, a widely read magazine, and public opinion prepared and aggressive, so that immediately upon the close of the war the large policy of Dominion grants to the Provinces of several million dollars annually may be pushed to completion."

I have taken this opportunity of presenting this proposition to you for your consideration. We all want to do our bit at the present time for our Empire, and the greatest help we can give is by making ourselves individually efficient, for whatever is before us. I will close with the following quotation from Chas. Kingsley:

> "The secret of thriving is thrift; saving of force, to get as much work as possible done with the least expenditure of power, the least jar and obstruction, the least wear and tear. And the secret of thrift is knowledge."

P.E.I. Association Meets.

A meeting of the Provincial Executive of the Provincial Association for the Promotion of Industrial Training and Technical Education met in the Board of Trade Rooms at Charlottetown on June 30th. In addition to the provisional officers and councillors named below, Mr. J. H. Grisdale, Director of Dominion Experimental Farms, Ottawa, was present.

Provisional Secretary Clark gave an outline of the purposes and objects of the proposed association, and showed what might be done at once by such an organization.

After a general discussion by all present, it was unanimously decided, on motion of Rev. P. P. Arsenault, seconded by Mr. G. A. Sharp, to form an Association for the promotion of Industrial Training and Technical Education for Prince Edward Island.

The following officers were elected: R. H. Campbell, President; J. O. Hyndman, Vice-President; J. A. Clark, Secretary Treasurer. The following were named as Councillors: Dr. N. S. Robertson, Principal Prince of Wales College; G.A. Sharp, A. McNair, W. H. Reek, Rev. P. P. Arsenault, M. S. Hogan, D. A. McKinnon, Rector Campbell, of St. Dunstans College; the Presidents of all the Boards of Trade in P. E. I., and the Mayors of all the incorporated towns.

The officers were appointed a committee to forward the resolution to the Conservation Commission asking for aid from them for organization purposes.

It was resolved, on motion of D. A. McKinnon, seconded by Father Arsenault: "That application be made to the Federal and Provincial Governments to provide a building for Industrial Training and Technical Education at Charlottetown."

Just as closing for press word arrived from Prince Edward Island notifying delegates to Dominion Conference appointed and "Training' adopted as the official organ of the Provincial Association for the Promotion of Industrial Training and Industrial Education. P. E. I.

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The Value of Scientific Research.

Industrial Results and Its Bearing on Commerce—Notable Instances Cited—How Canadian Agriculture Can Be Developed.

By Col. Thos. Cantley.

Technical Education may perhaps be defined as such training as will best qualify a worker in any sphere of agriculture, manufacturing, mining or other creative form of industry which will conduce to securing the largest measure of success in the particular branch of industry in which he is engaged.

The word "technical" as applied above in its narrowest sense may be taken as referring to the way in which an artist, workman or operator uses his tools, or the method he employs in converting his raw material into finished products. In the broader sense, what is understood by technology is the science or systematic knowledge relating to agriculture, mining, metallurgy, manufacturing or art, and embraces the whole field of human industry. It consists in the application of principles discovered by research and proven in the various physical sciences—Chemistry, Mechanics, Mineralogy—and the application of these to manufacturing processes, the term "manufacturing" being used in the broadest sense, including the grown field crops, stock raising and the converting of these into food products. These are quite as truly manufacturing processes as the conversion of Iron Ores into Pig Iron and Steel, or fashioning them into the various forms which that material takes in the arts and industries.

INDUSTRIAL RESULTS OF SCIENTIFIC RESEARCH.

The enormous advance in industrial achievements during the last century has been largely due to scientific research. In a general way it may be said that previous to the last half of the nineteenth century most of the industrial knowledge gained was by the slow method of "trial and error." Experience had shown, for instance, that ore smelted in a certain environment, and combined with certain elements, produced excellent material, while if wrought in a different way the results were unsatisfactory. As to why the results were different the reason was really not known, and until scientific research along chemical and physical lines was instituted no clear light was thrown on this and a great mass of allied industrial phenomena.

While it may be urged, and it is quite true, that many of the discoveries affecting industrial development were the result of accident or of the productive thought of careful observers and thinkers, still the great majority of the more important of such achievements brought about in the last half century had their origin and development in the chemical and other research laboratories of Great Britain and Europe. In the case of others which had been the outcome of inventive genius, the underlying secret of these was discovered, laid bare, and in many cases the processes of production were simplified, cheapened and their sphere of influence largely extended, as the scientific basis on which the processes rested was learned and applied.

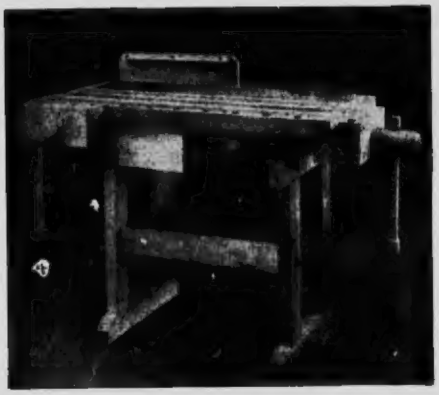
TWO NOTABLE INSTANCES CITED.

Two notable instances might be cited.

(1) Sir Henry Bessemer's method of producing steel, which is founded on the scientific fact that the carbon contained in molten pig iron might be eliminated by burning it out in a cupola or other suitable vessel in combination with oxygen, the oxygen being supplied by a blast of cold air introduced directly into the mass of molten metal.

(2) Some decades later, two chemists, Gilchrist and Thomas, working along entirely different lines, learned by long-continued laboratory experiments, that phosphorus had an affinity for lime, and when in solution in molten pig iron would desert the iron for the lime. From this scientific fact they worked out and elaborated what is known in Britain and America as the "Basic Process," and in Germany as the "Thomas System," whereby the phosphoric content of pig iron, formerly considered totally unsuitable for steel making, was extracted by treatment in a furnace lined with basic material and containing a basic slag.

Manual Training Equipment



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These two discoveries added enormously to the world's wealth; indeed, the entire steel industry of the world, as we know it today, depends almost entirely on these two inventions, both being the outcome of intelligent scientific research, and the practical application of scientific principles proven by laboratory experiments of these scientific workers.

HOW GREAT INDUSTRIES DEVELOPED.

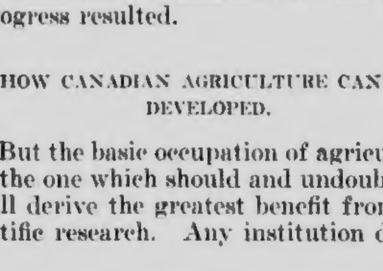
The gas industry; the great line of products from distillation of coal and coal-tar derivatives; the internal combustion engine; the great improvements of the steam engine as a prime factor for the transferring of heat into power; hydraulic power as applied by Sir William Armstrong to cranes and elevators; the hydraulic working of guns, hydraulic forging presses, and the endless varieties and applications of hydraulic power—all these are the outcome of scientific research. The enormous progress made in Aviation during the past decade is a direct result and outcome of scientific study of the problems involved, which up to a few years ago were little known. So long as Aviation depended upon the slow results of "trial and error," little progress was made; but so soon as certain scientific truths were discovered, and these results made known to the workers in that field of constructive work, great progress resulted.

HOW CANADIAN AGRICULTURE CAN BE DEVELOPED.

But the basic occupation of agriculture is the one which should and undoubtedly will derive the greatest benefit from scientific research. Any institution devoted to technical education, which aims to be complete as to its equipment, must include a department of Scientific Research.

A modern steel plant without a laboratory, a large sugar refinery without a staff of chemists, a great medical and surgical college without its chemical laboratory, research appliances and dissecting rooms—perhaps none of these would be any less well equipped for carrying on their work than would be a technical educational establishment without a department of Scientific Research.

In support of this statement we may point to the great technical institutions of the mother country, such as the great establishments at South Kensington, Manchester, Leicester, Birmingham, Sheffield; the Metropolitan School of Science, London; the Watt Institution of Edinburgh; a large number of technical institutions in the United States; and similar schools in France, Belgium and Switzerland; to say nothing of Germany, perhaps earlier in the field, more thorough in her methods, and more persistent in the work of scientific investigation than any other. The experiences of all these have blazed the trail in such a way that he who runs may read, and if after "The Great War" is brought to the inevitable successful conclusion, and the Dominion is to take its place as a supplier of agricultural and manufacturing products to the less favored portions of the world, and win for Canada the markets formerly exploited by Germany, technical education, backed by scientific research, must be made available to our farm and factory workers throughout the length and breadth of Canada, from the Nova Scotian Eastern Atlantic Coast to British Columbia's Pacific shores.



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Educating Vocational Advisors.

Who Shall Advise the Boy and Why—Suggested Course Outlined.

By A. B. Farmer, B.A.

"What shall I do? What shall I be?"

Sooner or later every school boy must settle this question for himself.

Whether as a result of careful, conscientious thought and study he comes to a deliberate decision, or whether he merely acquiesces in the wishes of others or follows the line of least resistance, he settles this great question for himself.

The wisdom of his answer must depend in large part upon the force with which the importance of the question of choice of vocation is impressed upon him, and the counsel available for his guidance.

Upon his decision, upon the suitability of the vocation chosen to his particular qualifications —physical, mental, emotional, and volitional—will depend his future happiness and his usefulness as a citizen.

WHO SHALL ADVISE THE BOY?

To whom shall the boy turn for counsel?

Shall he turn to his parents? In two cases out of three the parents can speak with confidence upon only one point: the father is in the wrong line. And when the father is successful, he is rarely qualified to judge whether or not his son will make a greater success in some other vocation.

Shall he consult successful men in various lines of business? Some of these through experience and observation become fairly adept in the selection of the raw material from which successful men in their particular lines of business can be developed. Many ambitious youths have been guided to a wise choice by business men. Yet the problem of gathering data in this way, and of sifting and comparing it, is too great for the average lad, and innate diffidence will prevent many a promising boy from using this plan at all.

Shall he consult his teacher? Many a boy does so to-day, and as a rule receives the very best counsel they are able to give. Some of our teachers are men of such breadth and experience as qualify them to advise. Yet what part of our teacher training courses is planned with this end in view—to make them wise guides in the choice of a calling?

The best the boy can do to-day is to consult some half-educated specialist, like myself, perhaps, who has gathered some knowledge of the subject from various sources at an expenditure of time and money ten times what should be necessary to produce a fully qualified expert.

N[illegible] TRAINING OF ADVISORS.

It is a regrettable fact that there is no institution to-day where the subject of vocational guidance is taught as it should be taught. The growing appreciation of the need for thoroughly qualified vocational advisors must result in the near future in the establishment of regular courses of instruction, either in connection with our universities or independently, where the man or woman with sufficient general education and experience who wishes to serve boys and girls by aiding them in the wise choice of pursuits can be as thoroughly equipped as the lawyer, the doctor, or the dentist is for his work in his college to-day.

To establish such a course on a satisfactory basis, considerable research work is still needed, and text books are yet to be written, but the requirements are clear.

SUGGESTED OUTLINE OF COURSE.

The subject matter of the course must group itself around two heads: First, Vocations; second, People.

Vocations must be studied more systematically and scientifically than they have been heretofore. The physical conditions, the mental requirements, and the emotional interests must be carefully observed, and the results embodied in textbooks so as to economize the time necessary for the vocational advisor to spend in actual observation of various pursuits and to enable him to utilize his opportunities for observation to the best advantage.

People must be studied— the differences of their physical and mental operations observed, and most important of all, each elemental power of intellect, feelings or will; yes, and of physical constitution likely at any time to prove of importance in determining fitness for any vocation related to such indications in the way of appearance, manner, voice, bearing, dress, and even handwriting as are easily observable.

THE BLAZED TRAIL.

The pioneer work in this direction has already been done. The trail was blazed years ago by Gall, Spurzheim, Combe, and the Fowlers, and I am one of those who agree with the late Dr. Alfred Russell Wallace in ranking the neglect of their work as one of the greatest failures of the nineteenth century. In other directions, Munsterberg, Scott, Taylor and others have done much in recent years; while in connection of the employment work of the Young Men's Christian Associations a definite effort has been made in recent years to bring together information regarding the requirements of various vocations.

It should not be long before the necessary textbooks are written, the necessary funds provided, and a steady stream of graduates fully qualified to confer with the boy and his parents, and advise regarding his future, with full knowledge not alone of the requirements of the various callings gained from both study and observation, but also of the boy's natural aptitudes gained from a careful study of his physical and mental development.

When such a course is established let us hope it will not be so far commercialized but that the standards of personal and educational requirements may be kept high. The choice of a boy's vocation is a matter of too great importance to be decided except with the very best counsel.

CANADA'S ORCHARD INDUSTRY.

Notwithstanding the considerable imports of American apples, Canada has within her own border an ample production of apples to meet all demands. According to the census of 1911, there were in Canada, 14,830,492 apple trees, of which about 60 per cent. only were in bearing. The average production is about 5,000,000 barrels per year, equal to 15,000,000 boxes. Canada exports about 1,250,000 barrels per year. The capital invested in the orchard industry of the Dominion in 1910 was estimated by W. W. Moore, Chief of the Markets Division, Department of Agriculture, Ottawa, at $127,000,000.

NOTES.

The Ontario Department of Education has just issued two small blue books, one containing Recommendations and Regulations for the establishment, organization and management of Industrial, Technical and Art Schools and Departments, and the other for Agricultural and Household Science Departments. The former contains also the text of the "Industrial Education Act of 1915," which is the basis of all technical education in this Province. These pamphlets may be had for the asking.

An account of the opening of Toronto's Central Technical School, and of the big convention to be held there, will be given in September issue of TRAINING, as will also an O.E.A. article.

Thomas A. Edison, at 68, has invented the telescribe, which gives him credit for more than 1,500 inventions, or more patents than were ever issued to any other one individual in all the realms of invention. The telescribe will enable "canned evidence" to be presented to a jury. A man cannot deny his own voice, and his own words recorded on a phonograph may be adduced in court. It is an electrical arrangement consisting of a sensitive telephone for convenient desk use, with controlling buttons to operate a special recording machine placed nearby. It is so sensitive that it will receive the same impressions of sound as the human ear, the slightest vibration being recorded. The sounds sent both ways are recorded on a cylinder record.

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